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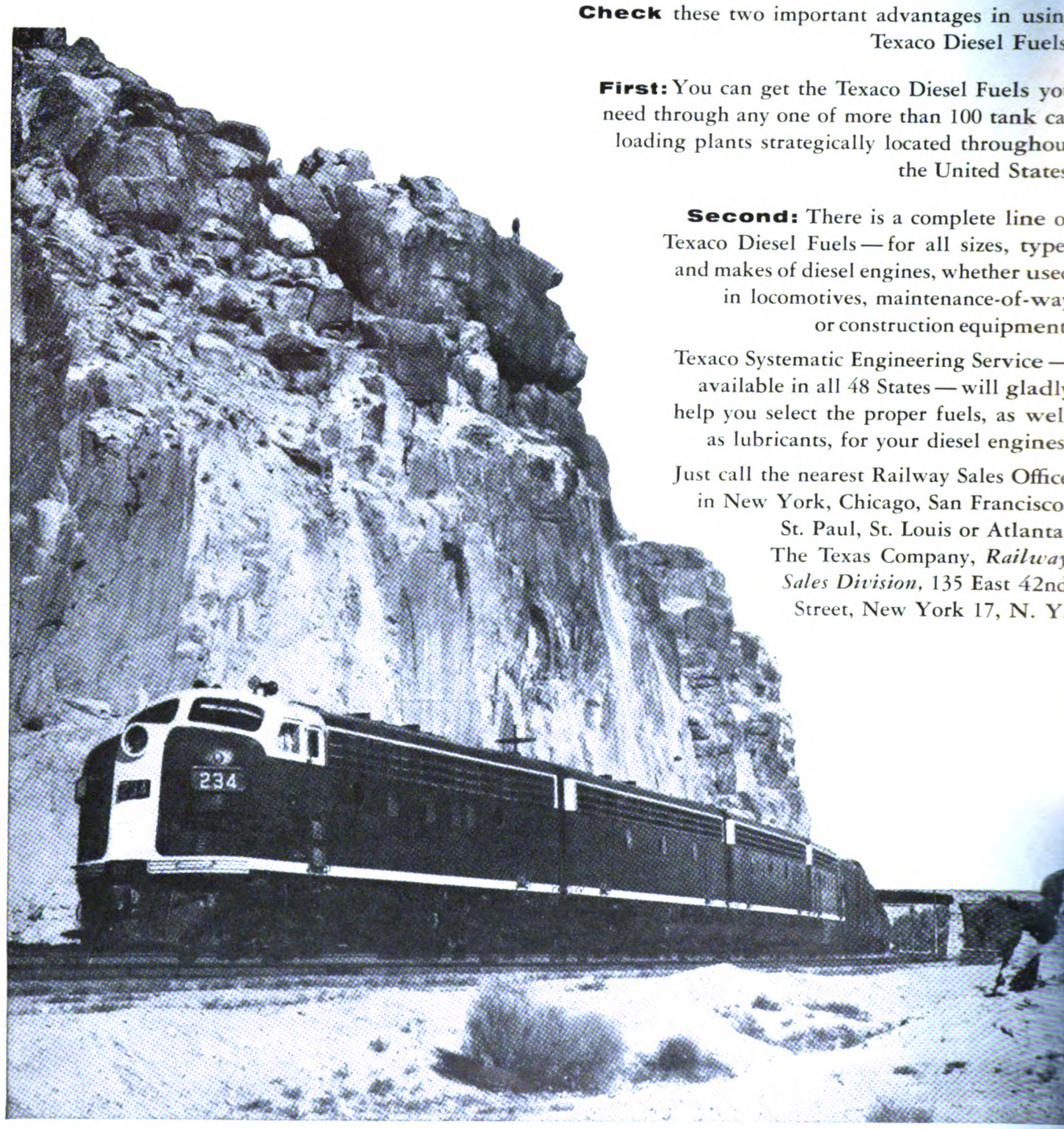

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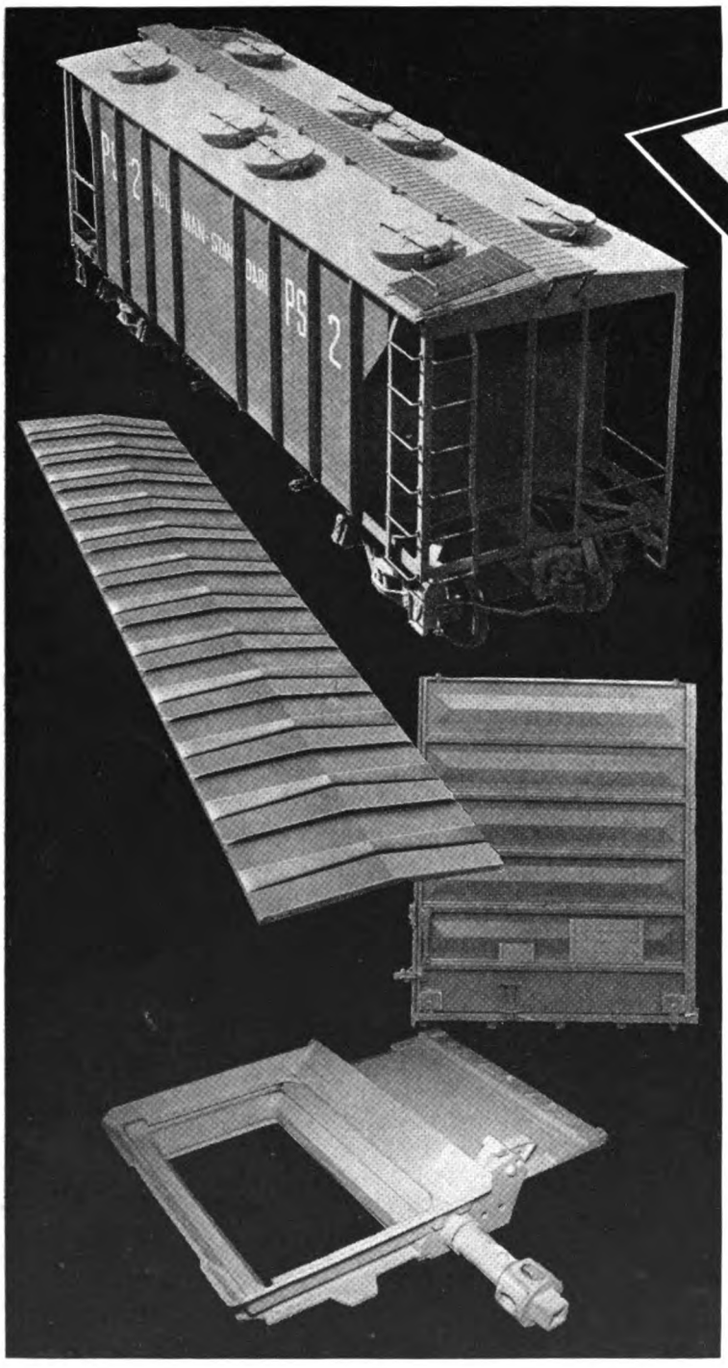

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RAILWAY LOCOMOTIVES AND CARS

Founded in 1832 as the American Rail-Road Journal

Index To Volume 132 1958

[Illustrated articles are indicated thus Letters to Editor thus ‡]*

A

ACF Industries, Inc.:
Containers for Malt; CRI&P and C&EI, Oct 24*
Plywood Lining, Technique for Securing, Feb 32*
Abrasive, Steel; Pangborn Rotoblast Steel Shot, June 62
Accidents: Bureau of Locomotive Inspection Report, Feb 28
Acme Steel Co.: Grain Door, Feb 6*
Adams & Westlake Steel and Aluminum Lantern, Jan 68*
Aeroquip Refrigerant Coupling, Nov 65*
Air Brake Association:
Officers, Sept 35* Oct 27*
Program, Aug 8; Sept 36; Reports, Oct 37*
Air Brakes (See Brakes, Air)
Air Compressor, Gardner-Denver Two-Stage, Feb 72*
Air Compressor Lubricant; Monsanto Chemical Co., Feb 6
Air Conditioning:
Elec. Sec. Report, Aug 39
H&M Cars, July 38*
Air Filters (See Filters, Air)
Air Filtration for Diesel Locomotives, May 30
Air-Maze Panel Type Oil Bath Filter, Oct 10*
Air Reduction Sales Co.: Heavy-Duty Welding Head, Mar 14*; Single-Stage Regulators, Apr 65* and Dec 60; Arc Welding Machines, Sept 20* and Dec 14*; Welding and Chipping Goggle, Dec 12*
Airnesco Percussion Cleaning System, Nov 70*
Albert Journal Lubricator, Aug 54*
Alco Products, Inc.:
Locomotive Facilities at Schenectady, June 68*
Morris, W. S., Elected President, June 66*
Allied Railway Supply Association:
Exhibit in 1959, Nov 5
Officers, Nov 5
Aluminum Laboratories Limited; Aluminum Center Sills Tested, Feb 25*
Aluminum Center Sills Prove Themselves, Feb 25*
Aluminum Company of America: Aluminum Roofs for Box Cars and Cabooses, May 10*
Aluminum Conductor Busway; GE, June 22
Aluminum Flooring; Reynolds Metals Co., Mar 7*
Aluminum Hopper Cars; Roberval & Saguenay, Feb 27*
Aluminum Roofs for Box Cars and Cabooses, May 10*
Aluminum Stud Cap, Huck Threadless, July 56*
American Chain & Cable Co.: Electric Chain Hoist, Feb 74*; Chain Repair Links, Aug 56*
American Institute of Electrical Engineers:
Improved D-C High-Potential Testing, Mar 46*
Land Transportation Committee Meets with Railroad Division of ASME, Jan 16; Mar 18; Apr 14; May 29, 30, 32, 34, 40
Transit Problems Topic at Summer Meeting, June 8
American Laundry Machinery Co.: Journal Lubricator Cleaner, Oct 10*
American Pamcor Multi-Range Hand Crimping Tool, Apr 8*
American Society of Mechanical Engineers:
Railroad Division:
Annual Meeting, Jan 16
Meeting with AIEE Land Transportation Committee, Jan 16; Mar.18; Apr 14; May 29, 30, 32, 34, 40
Riding Comfort of Passenger Cars, Jan 56*
UP 8500-Hp Gas Turbine-Electric Locomotives, Jan 33*
Ammeter, Tong Test; Columbia Electric Mfg. Co., Sept 74*
Amp Incorporated: Plastic Cable Wrapping, Jan 68
Anchoring System for Box Cars; Youngstown Steel Car Corp., June 18*
Angle Attachments, Gardner-Denver, Jan 70*
Ansul Dry Chemical Fire Extinguishers, Dec 12*
Anthony Co.: Remote-Controlled Truck Crane, July 58*
Apprentice Training Program; LV, Jan 23*
Apprenticeship Conference at St. Louis, June 14; Sept 5
Arcair Cutting Torch, Aug 18*; Model H-2, Nov 12*
Archer-Daniels-Midland Freight Liners, Mar 62
Armature Banding with Glass Tapes, Mar 46A*; June 48*
Armature Coil, GE-752, Oct 58
Armature Inspection and Test, Aug 48*
Armature Stripping, Nov 50*
Associated Research, Inc.: Insulation Resistance Tester, Mar 64*; Phase Sequence Switch, Mar 70*; Cable Fault Locater, Apr 68
Association of American Railroads:
Electrical Section:
Committee of Direction, Aug 38*
Officers, June 34*; Aug 38*
Program for Annual Meeting, June 32*
Association of American Railroads: (*Continued*)
Electrical Section:
Reports:
Air Conditioning and Refrigeration, Aug 39
Automotive and Electric Rolling Stock, Aug 39
Car Electrical Equipment, Aug 39
Electric Heating, Aug 44
Electrification, Aug 42
Illumination, Aug 46*
Locomotive Facilities and Procedures, Aug 42
Power Supply, Aug 44
Radio on Rolling Stock, Aug 42
Relations with Public Utilities, Aug 44
Welding and Cutting, Aug 39
Wire, Cable and Insulating Materials, Aug 44
Wiring Diagrams, Aug 42
Keller, W. M., Elected Vice-President, Feb 14*
Mechanical Division:
Arbitration Committee Upholds IC Payment for Car Repairs, Aug 14
Atlantic City Meeting in 1959 Postponed, July 27
Brake Rigging Specification Changed, July 5
Charges for Application of Journal Lubricating Devices, Oct 5
Committee Chairmen, Photos of, June 34*
Committee on Interpretations of Locomotive Inspection Rules, Sept 5
Committee on Red Book Rules, Aug 5
Coupler Yokes, Riveted; Extension Granted, Mar 22; Dec 5
Forest Products Loading; New and Revised Specifications, Mar 18
General Committee Members, June 33*; July 27
In-Date Air Brake Stenciling Required, Feb 14
Interchange Rules on Wheels Clarified, Mar 18
Lubricator Swab, Alternate Standard for, July 5
Maintenance of Brake Hanger Details, May 10
Organization of, June 33*
Officers and Staff, June 33*, 35*; July 27*
Program for Annual Meeting, June 32*
Proper Oil Level in Journal Boxes Equipped with Lubricating Devices, Dec 5
Reports:
Axles, July 31
Brakes and Brake Equipment, July 30
Car Construction, July 28
Couplers and Draft Gears, July 32
Geared Hand Brakes, July 31
Interchange Rules, July 31
Locomotives, July 28
Lubrication, July 29*
Wheel and Axle Manual, July 32
Wheels, July 32
Research Program, June 35*
Roller Bearing Inspection Requirements, Aug 5
Staff Changes, Feb 14*; Mar 18*
Atchison, Topeka & Santa Fe:
Air Filtration for Diesel Locomotives, May 30
Car, "Shock Control" Box, Aug 5; Oct 21*
Cars, 88-Ft. TOFC, Sept 48*
Cars, "Victory Gondola", Modernized, Jan 27*
Lube Oil Reclamation Plant at Topeka, July 25*
Axle Journal Lathe, Baldwin-Lima-Hamilton, July 12*
Axles, Mech. Div. Report on, July 31

B

Balancers, Thor Suspension, Jan 10*
Baldwin-Lima-Hamilton Corp.: Axle Journal Lathe, July 12*
Baltimore & Ohio:
Cars, Box, with Steel Lining, Sept 44*
Meter Boxes Aid Load Tests, July 42*
Precipitator for Cleaning Engine Air, May 32*
Slumbercoaches, Apr 42*
Steel Box-Car Lining, Sept 44*
Banding Armatures with FRP Tape, Mar 46A*; June 48*
Bangor & Aroostook: Production Line for Freight Car Painting, July 15*
Battery Charging Control, Edison, Mar 7*
Battery Packaging, Exide, July 56*
Battery Plate, Gould-National Siliconic, Dec 62*
Battery Thermostat; Vapor Heating Corp., Jan 10*
Bearings (See Journal Bearing Assemblies; Roller Bearings; Traction Motor Armature Bearing)
Bell-Ringer Heater, Prime, Nov 16*
Bells, Locomotive, Preventing Moisture in, May 56A*
Belt Railway of Chicago: Locomotive Bells Mounted High to Prevent Moisture Drainage, May 56A*
Beyer Peacock (Hymek) Ltd., Formed, Sept 83
Biddle, James G., Co.: Megger Low-Resistance Ohmmeter, Mar 14*
Binks Mfg. Co.: Paint Pump, Mar 66*; Hose Coupling Servicing Unit, Nov 16*
Black & Decker Magnetic Drill Press, Feb 70*
Black Light Eastern Corp.: Leak Detector, Sept 76*
Boston & Maine: RDC Shop at Boston, Mar 34*
Brake Adjuster, Air-Powered; SP, Nov. 34*
Brake, Budd Disc Freight, Oct 12*
Brake Equipment, Mech. Div. Report on, July 30
Brake Hanger Details, AAR Circular on Proper Maintenance of, May 10
Brake Rigging Specification Changed, July 5
Brake Shoes, Cobra; P&WVa Tests, Sept 72*
Brake Test Cabinet; FEC, Mar 50*
Brakes, Air:
6-SL, Questions and Answers on, Jan 60; Nov 52
24-RL, Schematic Study of, Apr 45*
26-L Equipment Applied by EMD, June 42*
AB Equipment, Schematic Study of, Feb 41*; Aug 29*
Brake Inspection Act, May 56; June 8; Aug 5
HSC, How FEC Tests, Mar 50*
Heat Damage to, Oct 37
In-Date Stenciling Required by AAR, Feb 14
Mech. Div. Report on, July 30
Modified Tests Proposed, Oct 37*
Report on Safety Tests Made by ICC, Feb 29
Schematic Study of, Feb 41*; Apr 45*; Aug 29*
Single Car Tester; FGE, May 44*
Brakes, Geared Hand, Mech. Div. Report on, July 31
Brandon Equipment Co.: Cushioning Device for Box and Flat Cars, Aug 18*
Branson Ultrasonic Cleaning Unit, Apr 66*
Brush, Carbon, GE Holder for, Oct 12*
Brushes, Carbon, Questions and Answers on, Jan 49*; Feb 58*; Mar 56*; Apr 54
Buckeye Tools Corp.: Torque Control Unit, Sept 24*
Budd Co.:
B&O Slumbercoaches, Apr 42*
Disc Freight Brake, Oct 12*
Pioneer III in PRR m-u Service, Aug 21*
Truck for Pioneer III, Aug 21*
Bulkhead, Adjustable Bookend; Industrial Development Services, Nov 12*
Bulkhead Flat Car Specifications, May 56
Bulkhead, Pressure; Visual Plant Layouts, Sept 24*
Busway with Aluminum Conductors; GE, June 22
Butte, Anaconda & Pacific: Electric Locomotives, Feb 44*
Byers, A. M., Co.: 4-D Wrought Iron, Apr 65

C

Cable:
Elec. Sec. Report, Aug 44
Locomotive Wiring; General Cable Corp., June 60*
Locomotive Wiring; General Electric, Sept 78
Cable Connector, Elastic Stop Nut Underground, Sept 77*
Cable Fault Locater; Associated Research, Apr 68
Caboose Power Supply: Safety Industries, Apr 8*; General Electric, Aug 18*
Calibrator for Fuel Injectors, Unitest, Nov 28*
Can, Safety; Eagle Mfg. Co., Oct 58*
Canadian Car & Foundry Co.: R&S Aluminum Hopper Cars, Feb 27*
Canadian National:
Car, Heated Box, Tested, Apr 18
Trucks, European Car, Tested, June 14
Canadian Pacific:
Controller, Portable, for Locomotives, May 48*
Wheels, BR and CR, Tested on Budd Cars, Apr 27*
Car Department Officers' Association:
Gebhardt, E. W., Secy-Treas., Mar 18*
Officers, Sept 35*; Oct 27*
Program, Aug 8; Sept 36; Reports, Oct 31
Car Repair Time-Savers, Mar 43*; May 44*
Car Repairing and Rebuilding: (See also Shops)
AT&SF 'Victory Gons' Modernized, Jan 27*
CofGa Spot Repairs at Macon, Sept 31*
C&EI Passenger Cars Rebuilt, Jan 30*
CB&Q Havelock Shops, Dec 30*; Other Shops and Repair Tracks, Dec 46*, 52*
Mechanical Refrigerators; Trouble Shooting Series, Mar 38*; May 37*; July 33*; Aug 141; Sept 53*; Nov 33*
Powasert Nailer Used by N&W, June 29*
Programmed Maintenance on LV, Jan 25
Servicing Mechanical Reefers, Oct 31
SP Upgrades Box Cars with Plywood, Nov 36*

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1958

Car Supply, Freight:
Bad Order Ratio Increases, Jan 18
Orders and Deliveries in 1957, Jan 18
Orders and Inquiries, Jan 16; Feb 14; Mar 18; Apr 14; May 14; June 14; July 5; Aug 14; Sept 10; Oct 7; Nov 10; Dec 8
Shippers' View on, Oct 27
Car Supply, Passenger: Orders and Inquiries, Jan 16; Sept 10; Dec 8
Cardwell Westinghouse Friction Draft Gear, Nov 14*
Cars, Freight:
Box:
AT&SF "Shock Control", Aug 5; Oct 21*
B&O, with Steel Lining, Sept 44*
CNR Tests Heated Car, Apr 18
CMStP&P 50-Ton, Sept 10*
Cabooses with Aluminum Roofs; GN, May 10*
Construction, Mech. Div. Report on, July 28
Flat:
AT&SF 88-Ft. TOFC, Sept 48*
C&EI Depressed-Center, Feb 33*
Equipped by StL-SF for Coil Steel, May 14*
Specifications for Bulkhead Cars, May 56
Gondola:
AT&SF 'Victory Gons' Modernized, Jan 27*
Cover for, Nov 14*
Hopper:
Aluminum Center Sills Tested, Feb 25*
CB&Q Super Jumbo Covered, Oct 24*
Cleaning Covered Hoppers, Nov 29*
Keystone Outlet for, Mar 7*
Roberval & Saguenay Aluminum, Feb 27*
SP Converted, for Malt Handling, Oct 25*
Standard 70-Ton; C&O-N&W-PRR, Sept 18; Oct 22*
Virginian Class H-14, 70-Ton, Apr 35*
Painting, on the BAR, July 15*
Piggyback Standardization; Mech. Div. Report, July 28
Refrigerator:
Aluminum Flooring; Reynolds Metals Co., Mar 7*
Preco Cargotemp Temperature Control, May 18*
Refrigerator, Mechanical:
Maintenance and Servicing of, Oct 31
PFE 40- and 50-Ton Cars, June 27*
Trouble Shooting Series, Mar 38*; May 37*; July 33*; Aug 141; Sept 53*; Nov 33*
Roller Bearing-Equipped, Number of, July 30
Shipper's View on Types Needed, Oct 27
Stock, with Adjustable Slats; NP, Apr 30*
Tank, without Running Boards; UTC, Mar 31*
Wood Chip; SP, Mar 39*
Cars, Passenger:
B&O Slumbercoaches, Apr 42*
Budd Pioneer III in PRR m-u Service, Aug 21*
C&EI Rebuilds 11 Cars, Jan 30*
C&NW Bi-Level, Nov 32*
CTA Research Program, Sept 10
H&M Air-Conditioned, July 38*
Riding Comfort of, Jan 56*
Cars, Special: Flat Car with Jib Crane for Handling Wheels; M&StL, Aug 36*
Castle Mfg., Inc.: Self-Propelled Scaffolding, Dec 12*
Center Sills, Aluminum, Prove Themselves, Feb 25*
Central Air Brake Club: Heat Damage to Air Brake Equipment, Oct 37
Central of Georgia: Macon Rip Track, Sept 31*
Ceramic-Coated Piston Heads; C&EI, Aug 27*
Chesapeake & Ohio: Standard 70-Ton Hopper Car, Sept 18; Oct 22*
Chicago & Eastern Illinois:
Cars, Passenger, Rebuilt, Jan 30*
Cars, Special Flat, Feb 33*
Ceramic-Coated Piston Heads, Aug 27*
Containers for Handling Malt, Oct 24*
Generator Coil Lifter, July 36*
Locomotive "Eliza Doolittle", Oct 5*
Chicago & North Western:
Cars, Bi-Level, Nov 32*
Elco Process for Clearing Carbon Grounds, Feb 58
Chicago, Burlington & Quincy:
Cars Painted with Rollers, Sept 34*
Cars, Super Jumbo Covered Hopper, Oct 24*
Control Plug and Box for Testing Locomotive Functions, Feb 45*
Coupler Bushings Made in Shops, Oct 43*
Diesel Engine Overhaul at West Burlington, Apr 32*
Milling Machine for Journal Box Wedges and Brake Shoe Heads, Mar 43*
Special Report:
Electrical Maintenance, Car and Locomotive, Dec 50*
Equipment Investments Pay Off, Dec 22*
Freight Car Building Operations, Dec 30*
Freight Car Repair Operations, Dec 30*, 46*
Locomotive Maintenance Program, Dec 25*, 38*, 50*
Mechanical Department, Goal of the, Dec 20*
Mechanical Department Organization Chart, Dec 21*
Test Stand Checks Generators and Regulators, June 55*
Chicago, Milwaukee, St. Paul & Pacific:
Cars, 50-Ton Box, Sept 10*
Diesel Boosters for Electric Locomotives, Sept 65*
Locomotives Equipped with 26-L Brake, June 42*
Moving Locomotives in the Shop, Dec 54*
Chicago Printed String Co.: Fiberglas Armature Banding Tape, Mar 46A*; June 48*
Chicago, Rock Island & Pacific:
Containers for Malt Handling, Oct 24*
Curve-Drawing Meters for Recording Locomotive Performance, June 52*
Chicago Transit Authority and Suppliers Engage in Research Program, Sept 10
Cincinnati Grinders, Inc.: Centerless Grinders, July 54*
Cincinnati Milling Machine Co.: Spindle Nose, Feb 18*
Circo Equipment Co.: High-Pressure Steam Cleaner, Dec 12*
Circuit Breaker Enclosure, GE Low-Cost, Feb 72*
Cleaners:
Fine Organics Waterless (Stratogel), Apr 66; Prepaint Treatment (Safe-Tee), Aug 54
Magnus Chemical RR-737 Desludging, Feb 6; 215-D Steam Cleaning Liquid Compound, Sept 77
Pangborn Rotoblast Steel Shot, June 62
Spray Products Nuts-Off Rust Solvent, July 56
Cleaning Equipment and Processes:
Abrasive Scrubbing, Jan 37*
American Laundry Machinery Journal Lubricator Cleaner, Oct 10*
Branson Ultrasonic Cleaning Unit, Apr 66*
Circo High-Pressure Steam Cleaner, Dec 12*
Covered Hopper Cars, Nov 29*
Diesel Parts, LMOA Report on, Oct 28, 51
Diesel Wheel Washing Machine; SP&S, Oct 23*
Homestead Valve Steam-Hydraulic Cleaner, Dec 62*
Locomotive Electrical Equipment, Jan 37*; Apr 62; Aug 48*
Magnus Miji-Lif Agitator Cleaner, Jan 70*
Magnus Mini-Dip Air-Powered Parts Cleaner, July 60*
Nesham Cleaning Gun, Aug 56*
NP Lubricator Pad Cleaner, Aug 32*
Oakite Rotating Spray Cleaner, Feb 6*
StL-SF Radiator Overhaul, Aug 24*
Wiping Waste Cuts Cleaning Costs, June 14
Cleaning, Locomotive: How Much Can You Afford to Do?, May 34
Clutch, Buckeye One-Shot, Sept 24*
Coatings:
Archer-Daniels-Midland Freight Liners, Mar 62
Ceramic-Coated Piston Heads, Aug 27*
Magnus Chemical Water-White Clear, Mar 70; Strip Coat, Sept 74*
Teflon, on Cutout Cock Keys; NY Air Brake Co., Nov 14
Cocks, Cutout, with Teflon Coated Keys, Nov 14
Collar, Huck 3LC Flange-Type, May 62*
Columbia Electric Mfg. Co.: Tong Test Ammeters, Sept 74*
Compressed Air Systems, Eliminating Moisture in, May 56A*
Compressor, Fairbanks, Morse Rotary, July 60*
Compressor Test Stand; WM, Oct 43*
Connectors:
Elastic Stop Nut Underground Cable, Sept 77*
MM&M Spring Wire, Feb 66*
Pyle-National Circuit Breaking Series "C", Apr 72*
Steam, Reclamation of.; NYC, Nov 44*
Containers:
Exide Battery Packaging, July 56*
Malt Handling; CRI&P and C&EI, Oct 24*
NYC Flexi-Van Operations, May 39*
PAT System Tested on UP, May 38*
Report of Joint Industry-Carrier Group, May 56
Control Plug and Box for Testing Locomotive Functions, Feb 45*
Control Unit, GMD Portable, for Locomotives, May 48*
Controller, Diesel, for Use with Electric Locomotives, Sept 65*
Coordinated Mechanical Associations:
Meeting Programs, Aug 8; Sept 36; Oct 27*
Officers, Sept 35*; Oct 27*
Cost of Dirt in Diesels, May 29, 30, 34
Coupler Bushings, CB&Q Makes, Oct 43*
Coupler-Butt Planning Jig; WM, Mar 43*
Coupler Yokes, Riveted, AAR Grants Extension on, Mar 22; Dec 5
Coupling, Aeroquip Refrigerant, Nov 65*
Coupling, Hose; Binks Servicing Unit, Nov 16*
Crane, Anthony Remote-Controlled Truck, July 58*
Crane Packing Co.: Monochromatic Light for Checking Surface Flatness, Jan 70
Crimping Tool, American Pamcor Multi-Range Hand, Apr 8*
Cylinder Head Reclamation; MP, Feb 34*

D

D-C High-Potential Testing, Advances in, Mar 46*; May 50*
Delaware, Lackawanna & Western: Propane Used for Yard Trucks and Cranes, Mar 46B*
Detector, Ground; Principle Research and Development Corp., Mar 7
Die, Cam-Type; Toledo Pipe Threading Machine Co., Aug 58*
Diesel Control Corp.: Fuel Injector Calibrator, Nov 28*
Diesel Injection Sales & Service Co.: Injector Nozzle Tester, July 60*
Dieselization of Railroads: N&W Passenger Service, Sept 10*
Dirt in Diesels, Cost of, May 29, 30, 34
Door, Acme Grain, Feb 6*
Draft Gear, Cardwell Westinghouse Friction, Nov 14*
Draft Gear, W. H. Miner Rubber, July 12*
Draft Gears, Mech. Div. Report on, July 32
Drill Press, Black & Decker Magnetic, Feb 70*
Drop Table; Manning, Maxwell & Moore, Sept 79*
Dryer for Traction Motors; NYC, Aug 44
Dryer, Miskella Portable Diesel, Aug 58*
Duff-Norton Worm Gear Jacks, June 22*; Lightweight Hoists, Sept 24*
Duro-Test Fluomeric Lamp, Nov 14*
Dye Penetrant Inspection Materials, Magnaflux, July 12

E

Eagle Mfg. Co.: Safety Can, Oct 58*
Edison, Thomas A., Industries: Automatic Battery Charging Control, Mar 7*
Elastic Stop Nut Corp. of America: Self-Locking Panel Nut, May 64*; Underground Cable Connector, Sept 77*; Spring Pin Kit, Dec 14*
Elco Process for Clearing Carbon Grounds, Feb 58
Eldorado Mfg. Corp.; Officers, Jan 66*
Electric Controls for EMD Diesels, Sept 60*
Electric Storage Battery Co.: Packaged Batteries, July 56*
Electrical Equipment, Car; Elec. Sec. Report, Aug 39
Electrical Equipment, Locomotive:
Dirt Damage to, May 29
Heavy Maintenance, Jan 37*; Feb 48*; Apr 56*, Aug 48*; Nov 50*
Electrification; Elec. Sec. Report, Aug 42
Elgin, Joliet & Eastern: Cushioning Device for Box and Flat Cars, Aug 18*
Engine and Electrical System Testers: Snap-On Tools Mar 14*
Engine-Frame Turning Device; PRR, July 36*
Engine Pits for Positioning Crankcases; UP, July 36*
Engines, Diesel:
Cleaning of Oil Coolers, Oct 29
Fairbanks, Morse Two-Cycle O-P, Turbo-Supercharging of, Mar 40*
PRR Tests Lubricating Oils, Feb 30*; Mar 36*
Radioactive Isotopes Test Wear; SP, May 10
Enterprise Railway Equipment Co.: Pneumatic Outlet Valve for Hopper Cars, Oct 12*
Epoxy Coil Corp.: Traction Armature Rewind Kit, Sept 76*
Epoxy Resins for Motor Re-insulation, Apr 70*
Epoxylite Corp.: Field Coil Insulation, Mar 62*; Epoxy Resins for Motor Re-insulation, Apr 70*
Erie: Motor-Generator Type Lamp Regulator, Apr 50*
Esterline Curve-Drawing Meters for Recording Locomotive Performance, June 52*
Evans Products Co.: To Manufacture and Sell Hydra-Cushion Underframes, May 58
Ex-Cell-O Reciprocating Tool Grinders, Feb 6*

F

Fairbanks, Morse & Co.:
Capacitor Motors, June 60*
Rotary Compressors, July 60*
Turbo-Supercharging of Two-Cycle O-P Diesel Engine, Mar 40*
Farr Co.: Oil-Bath Air Filter, May 18*
Fastener, Blind; Molly Corp., Apr 66*
Fastener, Huck Lockbolt, Aug 60*
Federal Machine Tool Co.: Diesel Nozzle Valve Grinder, Mar 64*
Fiberglas Armature Banding Tape, Mar 46A*; June 48*
Filters, Air:
Air-Maze Panel Type Oil Bath, Oct 10*
Farr Oil-Bath, May 18*
Precipitator for Cleaning Engine Air, May 32*
Radioactive Analysis Improves, Nov 5
Filters, Diesel Fuel, Wix Study of, Aug 28*
Filtration, Air, for Diesel Locomotives, May 30
Fine Organics, Inc.: Waterless Cleaner (Stratogel), Apr 66; Prepaint Treatment (Safe-Tee), Aug 54
Fire Extinguishers, Ansul Dry Chemical, Dec 12*
Flannery Bolt Company Now Part of Jersey Bolt & Spike Corp., Nov 67
Flashovers:
Do High Voltage Peaks Cause?, Mar 58
Should Flashed Motors be Removed?, May 56A
Floodlights, Pyle-National Mercury Vapor, May 60*
Flooring, Plastinail, How GN Applies, Aug 26*
Flooring, Republic Steel, Sept 20*
Floors, Aluminum, in Refrigerator Cars, Mar 7*
Florida East Coast: Electro-Pneumatic Brake Tests, Mar 50*
Forest Products Loading, New and Revised Specifications for, Mar 18
From the Diesel Maintainer's Note Book:
Diesel Days, Feb 63*
Diesel Seemed to be Starved for Fuel, May 54*
Diesel with Mixed Up Cooling, Dec 54*
Engine Ran Without Fuel, The, Apr 54; June 55*
Extension Cord Ties Diesel to Its Load, July 44*; Oct 51
If You were a Traction Motor...Which Would You Prefer?, Sept 68*
Perverse Reverser, The, Aug 46*
They Didn't Double Cross This Diesel, Nov 56*
When Amps Go Up Volts Go Down, Jan 42*; Mar 56*
Fruehauf Trailer Co.: Agreement with General American Transportation Corp., Oct 60
Fruit Growers Express:
Journal-Brass Carrier, Mar 43*
Single Car Air Brake Tester, May 44*
Fuel:
Diesel; Economy, Combustion Characteristics of, Sept 38; Dec 8
Diesel; Wix Filter Study, Aug 28*
Propane; DL&W Yard Trucks and Cranes, Mar 46B*
Relative Costs of Transmitting Electrical Energy vs. Transporting Fuel, Aug 44
Fuel Injectors, Unitest Calibrator for Testing, Nov 28*

G

Gardner-Denver Angle Attachments, Jan 70*; Air-Powered Screw Drivers, Nut Setters, Feb 66*; Two-Stage Air Compressor, Feb 72*; Hoistractor, Mar 68*; Impact Wrench, Sept 78*

General American Transportation Corp.:
Agreement with Fruehauf Trailer Co., Oct 60
Clejan Type Cars in Use, Sept 84*
Piggyback, Inc., Purchased by, June 68
SP Wood Chip Cars, Mar 39*
General Cable Corp.: Locomotive Wiring Cable, June 60*
General Electric Co.:
Advances Made in D-C Hi-Potting, Mar 46*; May 50*
Armature Coil (GE-752), Oct 58
Busway with Aluminum Conductors, June 22
Caboose Power Supply, Aug 18*
Carbon-Brush Holder, Oct 12*
Circuit Breaker Enclosure, Low-Cost, Feb 72*
Lamp, Bonus Line Mercury, Dec 14
Lamp Regulator, Motor-Generator Type, Apr 50*
Locomotive Repair Centers, May 58
Locomotive Wiring Cable, Sept 78
Locomotives, Electric; BA&P, Feb 44*
Luminaires, Fluorescent, at Grade Crossing, Apr 62*
Roll Them Out Like New Series, Jan 37*; Feb 48*; Apr 56*; Aug 48*; Nov 50*
UP 8500-Hp Gas Turbine-Electric Locomotives, Jan 33*
General Motors Corp.:
Aerotrains Temporarily Out of Service, July 5
Allison Division: Sleeve-Type Bearing, Oct 10*
Electro-Motive Division:
All-Electric Control for Diesels, Sept 60*
NYNH&H Diesel and Electric Locomotives, Mar 29*
1000th Diesel Upgraded, Oct 5*
To Build Free-Piston Locomotive, July 28
26-L Brake Equipment on CMStP&P GP-9's, June 42*
Hyatt Bearings Division: Traction Motor Armature Bearing, June 18*
General Motors Diesel, Ltd.: Portable Controller for Locomotives, May 48*
General Steel Castings Corp.:
C&EI Depressed-Center Flat Car Bodies, Feb 33*
Riding Comfort of Passenger Cars, Jan 56*
Truck for Pioneer III, Aug 22*
Generators:
Acetylene, Has Automatic Signal System; Linde Co., Feb 62*
Diesel Locomotive: Meter Boxes Aid Load Tests, July 42*; Test Stand for Checking, June 55*
Electric, for Caboose Power Supply; Safety Industries, Inc., Apr 8*
Electro-Hydraulic; Huck Mfg. Co., Mar 68*
Steam: C&EI Coil Lifter for, July 36*; Vapor Heating Corp., Sept 20*
Goggle, Welding and Chipping; Air Reduction Sales Co., Dec 12*
Gould-National Silconic Battery Plate, Dec 62*
Governor Test Stand Altered to Permit Complete Testing; Reading, July 36*
Grain, Methods for Bulk Handling of, Oct 24*
Gray Co.: Paint Spray Unit, Apr 66*
Grease, Gulfcrown RR, Oct 10
Great American Industries: Car Insulation, Oct 12*
Great Northern:
Cabooses, with Aluminum Roofs, May 10*
Covered Coach Repair Shop, Nov 48*
Plastinail Flooring Application, Aug 26*
Grinding Machines:
Cincinnati Centerless, July 54*
Ex-Cell-O Reciprocating Tool, Feb 6*
Federal Diesel Nozzle Valve Grinder, Mar 64*
MM&M Polishing and Grinding Wheels, Apr 8*
Grounds, Carbon, Elco Process for Clearing, Feb 58
Gulf Oil Corp.: Roller Bearing Grease, Oct 10
Gun, Nesham Cleaning, Aug 56*
Gypsum Association Traffic Committee: Bulkhead Flat Car Specifications, May 56

H

Hanger, Thompson Luminaire, Aug 62*
Heat Damage to Air Brake Equipment, Oct 37
Heaters:
Prime Bell-Ringer, Nov 16*
Safety Industries Infrared Unit, Sept 20*
Vapor Conversion Kits for, Aug 60*
Heating, Electric; Elec. Sec. Report, Aug 44
Henderson Medal Awarded to A. H. Morey, Oct 60*
Hewson Insulation Test Instrument, Aug 62
High-Potential Testing:
Armature Inspection and Test, Aug 48*
D-C, Advances Made in, Mar 46*; May 50*
Hoist, Duff-Norton Lightweight, Sept 24*
Hoist, Electric Chain; American Chain & Cable Co., Feb 74*
Hoist Trolley, Gardner-Denver, Mar 68*
Homestead Valve Mfg. Co.: Steam-Hydraulic Cleaner, Dec 62*
Hose Clamping Machine, Punch-Lok, Nov 66*
Hose Coupling, Binks Servicing Unit for, Nov 16*
Hot Boxes (See Journal Bearing Assemblies)
Huck Mfg. Co.: Hydraulic Power Pack, Mar 68*; 3LC Flange-Type Collar, May 62*; Threadless Aluminum Stud Cap, July 56*; Lockbolt Fastener, Aug 60*
Hudson & Manhattan: Air-Conditioned Cars, July 38*
Hunt-Spiller Ductile Iron Piston, July 58

I

Illinois Central:
AAR Arbitration Committee Upholds Payment for Car Repairs, Aug 14
Lifting Device for Hopper Bodies, May 44*
Illumination (See Lamps, Lighting)
Impact Tests on Aluminum Center Sills, Feb 25*
Industrial Development Services: Adjustable Bookend Bulkhead, Nov 12*
Infrared Unit; Safety Industries, Sept 20*
Ingersoll-Rand Air-Powered Impactools, Oct 12*
Injector, Fuel, Unitest Calibrator for Testing, Nov 28*
Injector Nozzle Tester; Diesel Injection Sales & Service, Inc., July 60*
Institute of Thread Machiners: Tests Show Wiping Waste Cuts Cleaning Costs, June 14
Insulating Materials; Elec. Sec. Report, Aug 44
Insulation:
Fiberglas Thermal, June 22; Aug 18*
Pad for Protecting Splices; MM&M, Feb 76*
Rubatex; Great American Industries, Oct 12*
Insulation, Electrical:
Backshop Testing of, Feb 54*
Cleaning of, Jan 37*
D-C High-Potential Testing, Advances in, Mar 46*; May 50*
Epoxy Resins for Motor Re-Insulation, Apr 70*
Field Coil; Epoxylite Corp., Mar 62*
Insulation Resistance Testers; Associated Research, Mar 64*; Hewson Co., Aug 62
Interchange Rules, CDOA Report on, Oct 32
Interchange Rules, Mech. Div. Report on, July 31
Interchange Rules on Wheels Clarified by AAR, Mar 18
International Nickel Co., Inc.: Welding Wire, June 22
Interstate Commerce Commission:
Annual Report, Feb 28
Brake Inspection Act, May 56; June 8; Aug 5
Bureau of Locomotive Inspection Report, Feb 28
Bureau of Safety and Service Report, Feb 29*
Locomotive Inspection Rules, New, May 14; Sept 5
Isotope, Radioactive, Improves Filter Design, Nov 5

J

Jacks:
Duff-Norton Worm Gear, June 22*
Joyce-Cridland Recessed, for Spot Repairs, Mar 7*; Air-Motor, Nov 16*
Kalamazoo Journal, Sept 78*
Templeton, Kenly Hydraulic, Dec 14*
Jig, Coupler-Butt Planning; WM, Mar 43*
Journal Bearing Assemblies:
Controlled-Clearance Solid Bearings, CDOA Report on, Oct 36
Hot Boxes:
CDOA Report on, Oct 32
Mandatory Bearing Replacement to Prevent, Aug 62‡
Monthly Reports, Jan 16; Feb 18; Mar 18; Apr 14; Sept 18
Roller Bearings, CDOA Report on, Oct 32
Sleeve-Type; Allison Div., GMC, Oct 10*
Solid Bearings, Improving Performance of, May 40*
Journal Boxes Equipped with Lubricating Devices, Proper Oil Level in, Dec 5
Journal Brass Carrier; Fruit Growers Express, Mar 43*
Journal Jack, Kalamazoo, Sept 78*
Journal Lubricator Cleaner; American Laundry Machinery Co., Oct 10*
Journal Lubricators (See Lubricators)
Journal Stops, Mech. Div. Report on, July 29*
Joy Mfg. Co.: Grounded Portable Lights, May 66*; Vulcanizing Press, June 62*
Joyce-Cridland Recessed Jack for Spot Repairs, Mar 7*; Air-Motor Jack, Nov 16*

K

Kalamazoo Mfg. Co., Journal Jack, Sept 78*
Kearney & Trecker Automatic Wheel Transfer Machine, Apr 8*
Keystone Railway Equipment Co.: Covered Hopper Car Outlet, Mar 7*

L

Lamp, Duro-Test Fluomeric, Nov 14*
Lamp, GE Bonus Line Mercury, Dec 14
Lamp Regulator, GE Motor-Generator Type, Apr 50*
Lantern, Adams & Westlake Steel and Aluminum, Jan 68*
Lathe, Axle Journal; Baldwin-Lima-Hamilton, July 12*
Lathe, Vertical Wheel; Snyder Tool & Eng. Co., Sept 24*
Leak Detector; Black Light Eastern Corp., Sept 76*
Lehigh Valley:
Programmed Maintenance at Sayre Shops, Jan 25
Stabilized Employment at Sayre Shops, Jan 23*
Lifting Device for Hopper Bodies; IC, May 44*
Light, Joy Grounded Portable, May 66*
Light, Monochromatic; Crane Packing Co., Jan 70
Light, Pyle-National Explosion-Proof Hand, Feb 68*
Lighting:
Car Repair Facilities at Potomac Yard, Jan 32*
Elec. Sec. Report on, Aug 46*
GE Fluorescent Luminaires at Grade Crossing, Apr 62*
Linde Co.: Acetylene Generator Has Automatic Signal System, Feb 62*; Hand Welding Torch, June 18*
Liner, Grain Door; J. J. Lipp Paper Co., June 18
Lining, Plywood, Techniques for Securing, Feb 32*; Nov 36*
Lining, Steel Box Car; Youngstown Steel Door Co., June 18*; B&O Cars, Sept 44*
Lining, Wagner Bros. Vyflex Fligid, Mar 62
Links, Chain Repair; American Chain & Cable Co., Aug 56*
Lipp, J. J., Paper Co.: Grain Door Liner, June 18
Loading Device for Box and Flat Cars; Brandon Equipment Co., Aug 18*
Loan Guarantees in Transport Bill, July 5
Locomotive Inspection Act Amendment Recommended by ICC, Feb 36
Locomotive Inspection Annual Report, Feb 28
Locomotive Inspection Rules, New, Issued by ICC, May 14; AAR Committee Interprets, Sept 5
Locomotive Maintenance: (See also From the Diesel Maintainer's Note Book; Preventive Maintenance; Shops)
CB&Q Operations at West Burlington, Apr 32* (Diesel Engines); Dec 38*, 50*
CB&Q Schedules and Controls, Dec 25*
Cleaning Diesel Parts, Oct 28, 51
Cost of Dirt in Diesels, May 29, 30, 34
Diesel Repair Time-Savers, July 36*; Oct 43*
Electrical Equipment, Jan 37*; Feb 48*; Apr 56*; Aug 48*; Oct 51; Nov 50*
Extension of Maintenance Intervals, Oct 29
Problems of; T. T. Blickle on, Oct 27
Programmed Maintenance on LV, Jan 25
Roll Them Out Like New Series, Jan 37*; Feb 48*; Apr 56*; Aug 48*; Nov 50*
System for Classifying Repairs Proposed, July 29
Locomotive Maintenance Officers' Association:
Officers, Sept 35*; Oct 27*
Program, Aug 8; Sept 36; Reports, Oct 28, 51
Locomotive Performance:
Curve-Drawing Meters for Recording, June 52*
UP Gas-Turbine Electrics, July 28
Locomotive Supply: Orders and Inquiries, Jan 16; Feb 14; Mar 18; Aug 14; Sept 10; Nov 10; Dec 8
Locomotives:
Device for Moving; CMStP&P, Dec 54*
Diesel and Electric: EMD's FL-9's; NYNH&H Mar 29*
Diesel Booster for Electric Locomotives, Sept 65*
Diesel-Electric:
Alco Switchers; Temperature Control, July 20*
C&EI "Eliza Doolittle", Oct 5*
CMSTP&P GP-9's with 26-L Brake, June 42*
Control Plug and Box for Testing Functions, Feb 45*
Dirt in, Cost of, May 29, 30, 34
Elec. Sec. Report, Aug 39
EMD All-Electric Control, Sept 60*
GMD Portable Controller, May 48*
Storage Methods; LMOA Report, Oct 30; CB&Q Dec 27
Electric; Butte, Anaconda & Pacific, Feb 44*
Gas-Turbine:
EMD to Build Free-Piston Model, July 28
UP 8500-Hp, Jan 33*
High-Horsepower, Under Test, Nov 5
Mech. Div. Report, July 28
P&WVa Tests Cobra Brake Shoes, Sept 72*
Steam-Turbine-Electric Retired by N&W, Feb 14
Long Island: M-U Shop at Jamaica, Oct 46*
Lubricants: (See also Oils)
Gulfcrown Roller Bearing Grease, Oct 10
Moly Sticks Add to Curve Rail Life, Oct 26*
Monsanto Chemical Air Compressor, Feb 6
Lubrication:
Flange, Cuts Rail Wear, on Reading, Oct 26*
Mech. Div. Report, July 29*
SP Roller Bearing Tests, Sept 56*
Lubricator Pad Cleaner; NP, Aug 32*
Lubricator Swab, Alternate Standard for, July 5
Lubricators, Flange; National Aluminate Corp., May 62*; Oct 26*
Lubricators, Journal:
Albert Mfg. Co., Aug 54*
AAR Price Schedule for Applying, Oct 5
CDOA Report, Oct 36
Magnus Metal Corp., Nov 12*; Correction, Dec 14
Mech. Div. Report, July 29
19 Types Which Can Be Applied, Mar 32*
N&W Experience, July 32*
Number of Cars Equipped with, Oct 36
PRR Use of, July 30
Premier Mfg. Corp., Dec 12*
Reclamation on the N&W, Jan 28*
Renovation of; Mech. Div. Report, July 29
Scullin Steel Co., Aug 18*
Seaboard Lubricator & Mfg. Co., Sept 20*
Uni-Pak, July 12*
Lugs, Pressure-Type Cable; National Electric Products Corp., Jan 10*

M

Magnaflux Dye Penetrant Inspection Materials, July 12
Magnus Chemical Co.: Mi ji-Lif Agitator Cleaner, Jan 70*; Desludging Cleaner, Feb 6; Water-White Clear Coating, Mar 70; Mini-Dip Air Powered Parts Cleaner, July 60*; Strip Coat SC100, Sept 74*; 215-D Steam Cleaning Liquid Compound, Sept 77
Magnus Metal Corp.: Improving the Performance of Solid Bearing Assemblies, May 40*; Lubricator Pad, Nov 12*; Correction, Dec 14
Maintenance (See Car Repairing and Rebuilding; Locomotive Maintenance; Preventive Maintenance; Shops)
Manning, Maxwell & Moore Drop Table, Sept 79*
Meter Boxes Aid Load Tests; B&O, July 42*
Meters, Curve-Drawing, for Recording Locomotive Performance, June 52*
Milling Machine for Journal Box Wedges and Brake Shoe Heads, Mar 43*
Milling Machine Spindle Nose; Cincinnati Milling Machine Co., Feb 18*
Miner, W. H., Inc.: Rubber Draft Gear, July 12*
Minneapolis & St. Louis: Flat Car with Jib Crane for Handling Wheels, Aug 36*

Minnesota Mining & Mfg. Co.: Spring Wire Connectors, Feb 66*; Joint Pad Protects Insulation, Feb 76*; PG Polishing and Grinding Wheels, Apr 8*; Pre-masked Reflective Sheeting, June 62; Insulating Tape, July 54
Miskella Infra-Red Co.: Portable Dryer, Aug 58*
Missouri Pacific: Cylinder Head Reclamation, Feb 34*
Molly Corp.: Blind Fasteners, Apr 66*
Monsanto Chemical Co.: Air Compressor Lubricant, Feb 6
Montreal Air Brake Club: Modified Air Tests, Oct 37*
Morton Mfg. Co.: One-Piece Running Board, May 66*
Motive Power and Car Statistics, Jan 18; Feb 16; Mar 22; Apr 18
Motors, Fairbanks, Morse Capacitor, June 60*

N

Nailer, Powasert, Used by N&W, June 29*
National Aluminate Corp.:
  TA Flange Lubricator, May 62*; Cuts Rail Wear on Reading, Oct 26*
  Water Treating Resin, Sept 20
National Carbon Co.: Questions and Answers on Carbon Brushes, Jan 49*; Feb 58*; Mar 56*; Apr 54
National Electric Products Corp.: Pressure-Type Cable Lugs, Jan 10*; Foot Booster Pipe Bender, Feb 68*
National Malleable & Steel Castings Co.: Carter Kissell Elected President, Mar 74
National Railroad Apprenticeship Conference, June 14; Sept 5
Nelson End-Welded Studs Secure Plywood Lining, Feb 32*
Nesham, L. C., Co.: Cleaning Gun, Aug 56*
New York Air Brake Co.: Cutout Cocks with Teflon Coated Keys, Nov 14
New York Central:
  Dryer for Traction Motors, Aug 44
  Flexi-Van Operations, May 39*
  Lighting in Ashtabula Shop, Aug 46*
  Reclamation Plant at Ashtabula, Nov 40*
  Temperature Control on Alco Switchers, July 20*
New York, New Haven & Hartford:
  Locomotives, EMD, Diesel and Electric, Mar 29*
  Trains, Two Lightweight, Retired, July 5
Norfolk & Western:
  Car, Standard 70-Ton Hopper, Sept 18; Oct 22*
  Locomotive, Coal-Fired Steam-Turbine-Electric, Retired, Feb 14
  Lubricator Pad Performance, July 32*
  Paint Stripping Operations, Oct 36*
  Passenger Service Dieselized, Sept 10*
  Powasert Nailer for Car Repairs, June 29*
  Reclamation of Lubricator Pads, Jan 28*
North American Car Corp.: Maj. Gen. E. C. R. Lasher to be Named President, Mar 74
Northern Pacific:
  Cars, Stock, with Adjustable Slats, Apr 30*
  Lubricator Pad Cleaner, Aug 32*
Nozzle, OPW Fueling, Apr 70*
Nuclear Science & Engineering Corp.: Radioactive Isotope Improves Filter Design, Nov 5
Nut, ESNA Self-Locking Panel, May 64*
Nut Setters, Gardner-Denver Air-Powered, Feb 66*

O

OPW Corp.: Fueling Nozzle, Apr 70*
Oakite Products, Inc.: Rotating Spray Cleaner, Feb 6*
Ohmmeter, Biddle Megger Low-Resistance, Mar 14*
Oil Cooler, Engine, Cleaning of, Oct 29
Oiler, Westinghouse Automatic Line, Jan 10*
Oils, Diesel Lubricating:
  AT&SF Reclamation Plant at Topeka, July 25*
  Effect of Ceramic-Coated Piston Heads on, Aug 27*
  PRR Tests; Spectographic Analysis, Feb 30*; Physical and Chemical Tests, Mar 36*
  Sunvis HD 340; Sun Oil Co., June 22
Outlet, Keystone Covered Hopper Car, Mar 7*
Owens-Corning Fiberglas Corp.: Thermal Insulation, June 22; Aug 18*

P

Pacific Fruit Express 40- and 50-Ton Mechanical Refrigerator Cars, June 27*
Paint Pump, Binks, Mar 66*
Paint: Sherwin-Williams Freight Car Enamel, July 60
Paint Spray Unit; Gray Co., Apr 66*
Paint Spray Unit, Spee-Flo Self-Contained, Mar 14*
Paint Stripping Operations; N&W, Oct 36*
Painting:
  BAR Freight Car Production Line, July 15*
  CB&Q Rolls Paint on Cars, Sept 34*
Pangborn Corp.: Rotoblast Steel Shot, June 62
Pennsylvania:
  Budd Pioneer III in m-u Service, Aug 21*
  Car, Standard 70-Ton Hopper, Sept 18; Oct 22*
  Engine-Frame Turning Device, July 36*
  Journal Lubricators, Use of, July 30
  Lubricating Oil Testing; Spectrographic Analysis, Feb 30*; Physical and Chemical Tests, Mar 36*
  Turbocharger Test Stand, Oct 43*
Piggyback Container System, PAT, May 38*
Piggyback Tie Downs; Mech. Div. Report, July 28
Pipe Bender, Foot Booster; National Electric Products Corp., Feb 68*
Pipe Cutters; Toledo Pipe Threading Machine Co., Nov 12*
Piston Heads, Ceramic-Coated; C&EI, Aug 27*
Piston, Hunt-Spiller Ductile Iron, July 58
Pittsburgh & West Virginia:
  Cleaning Flashed Motors in Place, May 56A
  Cobra Brake Shoes Tested in Road Service, Sept 72*
Plastic Cable Wrapping; Amp Incorporated, Jan 68
Plastic Coatings; Archer-Daniels-Midland, Mar 62
Plastinail Flooring, How GN Applies, Aug 26*
Plywood Linings, New Techniques for Securing, Feb 32* (End-Welded Studs); Nov 36* (Stapling)
Porter, H. K., Co.: Insulating Tape, Dec 12
Potomac Yard, New Car Repair Facilities at, Jan 32*
Power Supply:
  Caboose; General Electric, Aug 18*
  Caboose; Safety Industries, Apr 8*
  Elec. Sec. Report, Aug 44
Preco, Inc.: Cargotemp Temperature Control, May 18*
Premier Mfg. Corp.: Journal Lubricator, Dec 12*
Press, Joy Vulcanizing, June 62*
Preventive Maintenance:
  How Much Air Filtering Can You Justify?, May 30
  How Much Locomotive Cleaning Can You Afford?, May 34
  Pennsy Checks Its Lubricating Oil, Feb 30*; Mar 36*
  Precipitator for Cleaning Engine Air, May 32*
Prime Mfg. Co.: Solenoid Valves, Nov 12*; Bell-Ringer Heater, Nov 16*
Principle Research and Development Corp.: Ground Detector and Power System Alarm Control, Mar 7
Problem Page, Jan 56; May 56A*
Production Lines:
  Alco Facilities at Schenectady, June 68*
  BAR Paint Shop at Derby, July 15*
  CB&Q Havelock Car Shop, Dec 33*
  StL-SF Radiator Overhaul, Aug 24*
  Virginian Car Shop at Princeton, Apr 37*
Propane for Yard Trucks and Cranes; DL&W, Mar 46B*
Pullman-Standard Car Mfg. Co.:
  C&NW Bi-Level Cars, Nov 32*
  CB&Q Super Jumbo Covered Hopper Cars, Oct 24*
  PAT Container System Tested on UP, May 38*
  Welding Jig for Piggyback Flat Cars, Dec 58*
Pumps: Binks Paint, Mar 66*; Red Jacket Petroleum, Nov 65*
Punch-Lok Hose Clamping Machine, Nov 66*
Pyle-National Explosion-Proof Hand Lamp, Feb 68*; Circuit Breaking Series "C" Connectors, Apr 72*; Mercury Vapor Floodlights, May 60*

Q

Quantometer Testing of Lubricating Oils; PRR, Feb 30*

R

Radiators, How StL-SF Overhauls, Aug 24*
Radio; Elec. Sec. Report on, Aug 42
Rail Wear, Reading's Flange Lubrication Cuts, Oct 26*
Railway Electric Supply Manufacturers Association: List of Exhibitors, June 40*
Railway Fuel & Operating Officers' Association: Officers, Sept 35*; Oct 27*
  Program, Aug 8; Sept 36
Railway Locomotives & Cars: Staff Changes, Apr 14*; June 8*
Reading:
  Flange Lubrication Cuts Rail Wear, Oct 26*
  Governor Test Stand for Complete Testing, July 36*
Reamer, Ratchet; Toledo Pipe Threading Machine Co., May 64*
Reclamation:
  Diesel Cylinder Heads; MP, Feb 34*
  Journal Lubricator; Mech. Div. Report, July 29
  Journal Lubricator; N&W, Jan 28*
  Lubricating Oil; AT&SF, July 25*
  NYC Plant at Ashtabula, Nov 40*
  Steam Connectors; NYC, Nov 44*
  Wedge and Brake-Head; CB&Q, Mar 43*
Red Jacket Mfg. Co.: Petroleum Pumps, Nov 65*
Reflective Striping, MM&M Pre-masked, June 62
Reflectoscope, Sperry Portable, June 22*
Refrigeration, Elec. Sec. Report on, Aug 39
Regulators:
  Air Reduction Sales Single-Stage, Apr 64*; Dec 60
  Test Stand for Checking, June 55*
Relations with Public Utilities; Elec. Sec. Report, Aug 44
Republic Steel Corp.: Steel Flooring, Sept 20*; Gondola Car Cover, Nov 14*
Research, CTA-Suppliers Engage in, Sept 10
Resin, National Aluminate Water Treating, Sept 20
Reynolds Metals Co.: Aluminum Flooring, Mar 7*
Richmond, Fredericksburg & Potomac: Car Repair Facilities at Potomac Yard, Jan 32*
Ride Recorder, Three-Way, Jan 58
Ridge Tool Co.: Hex Wrench, Nov 14*
Riding Qualities of Passenger Cars, Jan 56*
Rip Track (See Shops)
Roberval & Saguenay Aluminum Hopper Cars, Feb 27*
Roll Them Out Like New Series, Jan 37*; Feb 48*; Apr 56*; Aug 48*; Nov 50*
Roller Bearing Inspection Requirements, AAR, Aug 5
Roller Bearing Lubrication Tests; SP, Sept 56*
Roller Bearing Plant at Columbus, Timken, June 66; July 26*
Roller Bearings; CDOA Report on, Oct 32
Roller Bearings, Cars Equipped with, July 30
Roofs, Aluminum, for Box Cars and Cabooses, May 10*
Running Board, Morton One-Piece, May 66*
Rust Solvent, Spray Products Nuts-Off, July 56

S

Safety Appliance Act Amendments Recommended by ICC, Feb 36
Safety Can; Eagle Mfg. Co., Oct 58*
Safety Industries Caboose Power Supply, Apr 8*; Air-Conditioning in H&M Cars, July 38*; Infra-Red Unit, Sept 20*
Safety Inspections, ICC Report on, Feb 29*
St. Louis Car Co.: CTA Test Cars, Sept 10
  H&M Air-Conditioned Cars, July 38*
St. Louis-San Francisco:
  Car, Flat, for Coil Steel, May 14*
  Radiator Overhaul; Springfield, Aug 24*
Scaffolding, Castle Self-Propelled, Dec 12*
Screw Drivers, Gardner-Denver Air-Powered, Feb 66*
Scullin Steel Co.: Journal Lubricator, Aug 18*
Seaboard Lubricator & Mfg. Co.: Journal Lubricator, Sept 20*
Sherwin-Williams Freight Car Enamel, July 60
Shops:
  Car:
    B&M RDC Shop at Boston, Mar 34*
    CofGA Rip Track at Macon, Sept 31*
    CB&Q at Havelock, Dec 30*; Other Shops and Repair Tracks, Dec 46*, 52*
    GN Covered Coach at St. Paul, Nov 48*
    Joyce-Cridland Recessed Jack for Spot Repairs, Mar 7*
    Long Island m-u Shop at Jamaica, Oct 46*
    Potomac Yard Facilities, Jan 32*
    Union Tank Car Company Dome, Apr 74*; Nov 25*
    Virginian at Princeton; Production Line, Apr 37*
  Diesel:
    Alco Facilities at Schenectady, June 68*
    CB&Q at West Burlington, Apr 32*; Dec 28*
    Receiving and Inspecting Equipment at, Feb 48*; Disassembling Equipment, Apr 56*
    SP Light Repair at Houston, June 30*
  Elec. Sec. Report, Aug 42
  LV Stabilizes Employment at Sayre, Jan 23*
  Paint: BAR at Derby, July 15*
Signal System on Acetylene Generator, Feb 62*
Simpson Electric Co.: Dual Range Therm-O-Meter, Nov 66*
Snap-On Tools Corp.: Engine and Electrical System Testing Set, Mar 14*; Tool Truck, Nov 16*; Tool Set, Dec 14*
Snyder Tool & Eng. Co.: Vertical Wheel Lathe, Sept 24*
Socony Mobil Oil Co.: Combustion Characteristics of Economy Fuels, Sept 38; Dec 8
Solvents (See Cleaners)
Southern Pacific:
  Cars, Box, Upgraded with Plywood, Nov 36*
  Cars, Converted Hopper, for Malt, Oct 25*
  Cars, Wood Chip, Mar 39*
  Diesel Light Repair Shop at Houston, June 30*
  Hydra-Cushion Underframe Rights and Patents Sold, May 58
  Power Brake Adjuster, Nov 34*
  Radioactive Isotopes Test Engine Wear, May 10
  Roller Bearing Lubrication Tests, Sept 56*
  Wheel-Handling Fork Lift, May 44*
Spectrographic Analysis on the PRR, Feb 30*
Spee-Flo Package Spray Painting Unit, Mar 14*
Sperry Products, Inc.: Portable Reflectoscope, June 22*
Spokane, Portland & Seattle: Machine for Cleaning Diesel Wheels, Oct 23*
Spray Painting (See Paint)
Spray Products Corp.: Nuts-Off Rust Solvent, July 56
Spring Pin Kit; Elastic Stop Nut Corp., Dec 14*
Standard Railway Equipment Mfg. Co.: W. E. Olds Appointed President, June 68*
Stratoflex, Inc.: New Officers, June 68
Strick Trailers: NYC Flexi-Van Equipment, May 39*
Strip Coat; Magnus Chemical Co., Sept 74*
Striping, MM&M Pre-masked Reflective, June 62
Stud Cap, Huck Threadless Aluminum, July 56*
Sun Oil Co.: Diesel Lubricating Oil, June 22
Switch, Phase Sequence; Associated Research, Mar 70*

T

Tape, Glass, Armature Banding with, Mar 46A*; June 48*
Tape, Insulating; MM&M, July 54; H. K. Porter Co., Dec 12
Temperature Control; NYC Alco Switchers, July 20*
Temperature Control, Preco Cargotemp, May 18*
Templeton, Kenly Hydraulic Jacks, Dec 14*
Test Stand Checks Generators and Regulators, June 55*
Testing Equipment (See Equipment Desired)
Tests:
  Air Brake, Modified, Proposal for, Oct 37*
  Aluminum Center Sills, Feb 25*
  Armature Testing, Aug 48*
  Brakes, HSC; FEC, Mar 50*
  Determining Whether Locomotive Work Should be Done in the Railroad or Manufacturers' Shop, Feb 48*
  Insulation, Electrical, Feb 54*
  PRR Tests Lube Oil, Feb 30*; Mar 36*
  Precipitator for Cleaning Engine Air; B&O, May 32*
  Radioactive Isotopes Test Engine Wear; SP, May 10
  Riding Qualities of Passenger Cars, Jan 58*
  SP Lube Tests Roller Bearings, Sept p 56*
  Wheels, BR and CR, on Budd Cars; CPR, Apr 27*
Therm-O-Meter, Dual Range; Simpson Electric Co., Nov 66*

Thermostat, Battery: Vapor Heating Corp., Jan 10*
Thomas & Betts Nylon Tie for Wire Bundling, Nov 12*
Thompson Electric Co.: Luminaire Hanger, Aug 62*
Thor Power Tool Co.: Suspension Balancers, Jan 10*
Tie, Thomas & Betts Nylon, for Wire Bundling, Nov 12*
Timken Roller Bearing Co.: Columbus Plant, June 66; July 26*
Toledo Pipe Threading Machine Co.: Ratchet Reamer, May 64*; Pipe Vise, June 22*; Cam-Type Die, Aug 58*; Pipe Cutters, Nov 12*; Combination Vise and Stand, Nov 14*
Tool Set; Snap-On Tools Corp., Dec 14*
Tool Truck; Snap-On Tools Corp., Nov 16*
Torches, Arcair, Aug 18*; Nov 12*
Trackmobile, Whiting Torque Converter, Apr 68*
Traction Motor Armature Bearing, Hyatt, June 18*
Traction Motor Armature Rewind Kit; Epoxy Coil Corp., Sept 76*
Trailer-on-Flat-Car Service:
  Containers for Malt; CRI&P and C&EI, Oct 24*
  Equipment Standardization; Mech. Div. Report, July 28
  NYC Flexi-Van Operations, May 39*
  PAT Container System, May 38*
Training of Employees:
  Air Brake Self-Study Course, Feb 41*; Apr 45*; Aug 29*
  Apprentice Training Program; LV, Jan 23*
Truck, Fork Lift, for Handling Wheels; SP, May 44*
Truck, Tool; Snap-On Tools Corp., Nov 16*
Trucks, Car:
  Budd, for Pioneer III, Aug 21*
  CNR Tests European Trucks, June 14
  CTA Research Program, Sept 10
  General Steel Castings, for Pioneer III, Aug 22*
Trucks, Locomotive: Flexicoil, on EMD's FL-9's, Mar 30*
Turbocharger Test Stand; PRR, Oct 43*
Turbo-Supercharging of Two-Cycle O-P Diesel Engine Announced by Fairbanks, Morse, Mar 40*

U

Underframes:
  Floating; AT&SF DF Box Cars, Aug 5; Oct 21*
  Hydra-Cushion; SP Sells Rights and Patents, May 58
Union Pacific:
  Locomotives, 8500-Hp Gas Turbine-Electric, Jan 33*
  PAT Container System Tested, May 38*
Union Pacific: (*Continued*)
  Pits for Positioning Crankcases, July 36*
  Turbines and Diesels in Multiple, Dec 5
Union Tank Car Co.:
  Dome Structure for Car Repairs, Apr 74*; Nov 25*
  Tank Car Without Running Boards, Mar 31*
Uni-Pak Journal Lubricator, July 12*
United Shoe Machinery Co.: Powasert Nailer, June 29*
United States Steel Corp.: Armature Banding with Glass Tapes, Mar 46A*

V

Valves:
  Outlet, for Hopper Cars; Enterprise Railway Equipment Co., Oct 12*
  Solenoid; Prime Mfg. Co., Nov 12*
  Temperature Control; Alco Switchers, July 20*
Vapor Heating Corp.: Battery Thermostat, Jan 10*; Conversion Kits for Heaters, Aug 60*; Steam Generators, Sept 20*
Virginian:
  Cars, Class H-14 70-Ton Hopper, Apr 35*
  Production Line at Princeton Car Shop, Apr 37*
Vise and Stand, Combination; Toledo Pipe Threading Machine Co., Nov 14*
Vise, Pipe; Toledo Pipe Threading Machine Co., June 22*
Visual Plant Layouts: Pressure Bulkhead Loading Device, Sept 24*

W

Wagner Bros., Inc.: Vyflex Fligid Lining, Mar 62
Waugh Equipment Co.: To Manufacture and Sell Hydra-Cushion Underframes, May 58
Welding and Cutting; Elec. Sec. Report, Aug 39
Welding Equipment and Processes:
  Airco Arc Welders, Sept 20*; Dec 14*
  Airco Heavy-Duty Welding Head, Mar 14*
  Heliarc, Used on C&EI Passenger Cars, Jan 30*
  Inco-Weld A Wire, June 22
  Linde Hand Torch, June 18*
  Plywood Lining, Technique for Securing, Feb 32*
  Pullman-Standard Jig for Piggyback Cars, Dec 58*
  Virginian Class H-14, 70-Ton Hopper Cars, Apr 35*
Western Maryland:
  Compressor Test Stand, Oct 43*
  Coupler Butt Planning Jig, Mar 43*
Westinghouse Air Brake Co.:
  Oiler, Automatic Line, Jan 10*
  26-L Brake Equipment Applied by EMD, June 42*
Westinghouse Electric Corp.:
  Banding Armatures with FRP Tape, June 48*
  Precipitator for Cleaning Engine Air, May 32*
Wheel and Axle Manual; Mech. Div. Report, July 32
Wheel-Handling Fork Lift; SP, May 44*
Wheel Slide, P&WVa Equips Road Locomotives with Cobra Brake Shoes to Prevent, Sept 72*
Wheel Slip: Reading Adds Years to Curve Rail Life with New Lubricant, Oct 26*
Wheel Transfer Machine, Kearney & Trecker, Apr 8*
Wheels, Car:
  CPR Tests BR and CR Wheels on Budd Cars, Apr 27*
  Interchange Rules Clarified by AAR, Mar 18
  Mech. Div. Report, July 32
Wheels, Locomotive:
  Machine for Cleaning; SP&S, Oct 23*
  Mech. Div. Report, July 32
Whiting Corp.: Torque Converter Trackmobile, Apr 68*
Wiping Waste Cuts Cleaning Costs, June 14
Wire, Elec. Sec. Report on, Aug 44
Wire, Welding; International Nickel Co., June 22
Wiring Diagrams, Elec. Sec. Report on, Aug 42
Wix Corp.: Diesel Fuel Filter Study, Aug 28*
Wrapping, Plastic Cable; Amp Incorporated, Jan 68
Wrench, Gardner-Denver Impact, Sept 78*
Wrench, Ingersoll-Rand Impact, Oct 12*
Wrench, Ridge Tool Hex, Nov 14*
Wrought Iron, A. M. Byers 4-D, Apr 65

Y

Yard Equipment, Engine-Driven, DL&W Uses Propane for, Mar 46B*
Youngstown Steel Car Corp.: Strap Anchor Belt Rails, June 18*
Youngstown Steel Door Co.: Steel Box Car Lining, June 18*; B&O Cars, Sept 44*

Z

Zippertubing for Harnesses, Feb 74

AUTHORS

Adams, L. L., Oct 27
Adams, M. B., May 30
Blickle, T. T., Oct 27
Burdick, W. E., Jan 56
Clarke, Owen F. Jan 16
Davis, W. F., Feb 48; Apr 56; Aug 48; Nov 50
Devlin, E. B., Aug 62
Ephraim, Max, Jr., June 55
Eunson W. H., June 48
Gowans, F. D., Jan 33
Hanson, M. A., May 40
Horine, J. W., May 29
Judy, B. L., May 34
Kangas, P., May 32
Kern, W. C., May 32
Kramer, T. A., Sept 38; Dec 8
Kresge, W. A., May 56A
Legg, L. E., May 56A
Martin, C. W., Mar 60; Oct 51
Matz, K. R., Jan 49; Feb 58; Mar 56; Apr 54
Noble, D. H., May 34
Odok, A. M., Mar 46
Osterhout, D. P., Jr., Sept 38; Dec 8
Pond, C. E., July 32
Richardson, E. L., May 32
Schneider, William, June 48
Smith. V. L., May 56A
Soelaiman, T. M., Mar 46
Striver, B. A., Aug 46; Dec 54
Taylor, Gordon, Jan 42; Feb 63; Mar 60; Apr 54; May 54; July 44; Sept 68; Oct 51; Nov 56
Teker, J. W., Jan 37
Wheaton, V. N., May 50
Wilson, James, Aug 28
Wright, Ken, Mar 38; May 37; July 33; Sept 53; Nov 33
Young, Ralph, Aug 28

RAILWAY AND SUPPLY TRADE APPOINTMENTS

[*Indicates Photograph]

Ahlstrom, Elmer W. Jan 67*
Akers, D. C., Aug 66
Aldag, Robert, Apr 76*
Alderuccio, Lee, Dec 60
Allen, E., Woodward, Nov 68
Anderson, Donald A., May 60
Anderson, H. R., Oct 7
Anderson, Marvin, Apr 76
Arms, E. L., June 14
Armstrong, C. B., Apr 76

Baker, Frank E., June 14
Baker, George D., Apr 76
Baker, H. J., Dec 56
Baker, James V., June 66
Baker, W. A., Dec 57
Baldwin, T. W., Sept 83
Ball, J. B., Sept 35*
Baltzell, Victor L. Feb 18
Baltzell, William A., Aug 64*
Bardouski, William T., Nov 67
Basch, J. Justin, Aug 64
Batchman, R. F., Sept 18
Beard, Archie K., June 66*
Beck, Robert J., Jan 66
Becker, Seymour, Nov 10*
Beckner, J. W., Jan 63
Beetle, Robert H., Sept 83*
Beischer, George M., Feb 16; June 14
Beisler, R. E., Aug 66
Bellhouse, T. W., Feb 16*
Bennett, G. Norman, Dec 60
Bennewitz, Robert H., Mar 74
Bergren, Clarence B., Jan 67
Beswick, R. M., June 66*
Bettle, Griscom, Jr., Oct 60
Bexon, L. H., July 10
Bikle, William E., June 68*
Binkerd, Robert H., Oct 60
Bish, Raymond H., Apr 76
Bishop, Ora C., Jan 18
Bittner, W. N., Apr 74; Nov 10
Blackburn, C. V., Dec 58
Bland, C. R., Aug 38*
Blickle, T. T., Sept 35*; Oct 27*
Blount, H. W., Sept 18
Bogan, Robert F., Feb 16
Bohon, D. L., Jan 67
Bollinger, John J., July 48
Bollman, Robert A., Feb 18*
Bonifazio, John A., Mar 74
Bootes, Henry V., Oct 7*
Borsos, Richard F., Jan 63
Boudreau, V. J., Jan 66*
Boulay, William H., Mar 22; Dec 56
Bourgeois, J. G., Aug 62
Bouska, James G., Oct 60
Bowen, John E., Dec 56
Bowlds, William A., Aug 62
Bovette, H. R., Nov 10; Dec 57
Brannan, J., Sept 18
Brehm, J. E., Sept 18
Bremer, Clarence Dr., Aug 64
Bressette, Delbert M., Dec 56
Bricmont, R. J., Feb 18
Britton, F. E., Feb 16
Brooks, Arthur E., Dr., Sept 83
Brooks, J. Gardner, June 66
Brossard, J. L., Mar 22
Brown, E. W., Apr 74
Brown, Ralph Wilson, Dec 58
Brown, William O., Apr 76
Bryan, Charles W., Jr., July 10
Burk, Elmer E., Nov 67
Burney, Everett H., July 10
Burns, M. B., Apr 76
Burson, Robert G., May 60; Oct 60*
Butcher, L. L., Nov 68
Butcher, O. T., June 14
Cagle, Guy N., Aug 62
Cahill, A. P., July 10
Campbell, Edward J., Jan 67
Campbell, L. F., June 14
Carpenter, K. H., Oct 27*
Carver, John L., Sept 18
Chalfant, A. S., Feb 18*
Chaplin, Wallace H., Feb 14
Charlton, Thomas R., Nov 68
Chavis, James J., July 48
Chessin, Hyman, Dr., Dec 60
Chinn, Rollin J., Dec 56
Christian, George B., Apr 74
Clark, Hollis E., June 14
Clarke, G. A., Dec 57
Clarke, Owen, Feb 14
Clemence, Arthur G., Jan 63
Clute, Ray V., Dec 60
Cogshall, James H., Aug 64
Coleman, L. B., Feb 16
Collins, L. Graham, June 66; Sept 82
Colt, H. F., Jr., May 58
Combes, Charles L., Apr 14*; June 8*
Connaughton, James F., Feb 18
Cook, Harrison C., June 14
Cook, W. B., July 10
Coughlan, Robert E., Oct 60
Cover, Howell T., Jan 64
Covert, R. M., Aug 64*
Cowan, John D., Aug 62
Cox, H. K., Sept 18
Craft, Jack L., Jan 63
Crawford, James M., Aug 64
Creasy, W. B., Jr., Sept 18
Cremonese, N. J., Aug 66
Crenshaw, James A., Oct 7
Cromer, T. S., July 10
Cronin, J. G., Mar 76
Crowder, E. C., Jr., July 10
Crowley, Miles B., Feb 16*
Cumming, John G., Aug 66
Curcio, A. J., Mar 22
Cyr, W. H., July 10

Davis, K. W., June 68
Davis, Marvin A., Aug 62
Davis, R. H., Dec 57
Day, M. J., Dr., July 48
Deery, H. F., Apr 74
DeGeer, Douglas V., Dec 57*
Delano, F. A., Jan 18
DeLeeuw, D. C., Feb 16
Denney, F. R., Sept 35*
Denney, Thomas L., June 66*
De Santo, Joe, Apr 76
Devaney, W. L., Jan 18
DeWaltoff, Lionel, Dec 57*
Dickover, Ward, Jan 67
Donovan, L. T., Feb 14; Mar 18*
Douglas, Kenneth G., Jan 66*
Douglass, J. R., Mar 22
Dowdy, M. B., Sept 18
Downs, Fred S., Apr 76*
Drake, J. C., Aug 66
Duff, James E., Mar 74*
Dunn, F. P., May 14
Dunn, Oscar L., Aug 64
Dunn, P. C., Jan 18

Edson, Kenneth C., Feb 18
Egbert, Perry T., June 66
Ehrman, S. M., July 10
Eleazer, Prince B., Jr., Jan 64
Eliasek, James G., Feb 18; Apr 26
Ellis, E. C., Dec 56
Ellis. R. D., July 10
Elsey, George W., Apr 76
Elsey, Warren R., Aug 64
Enzian, R. I., Feb 18
Epperson, E. G., Jan 63
Evans, Robert L., Aug 64

Fabian, Joseph, July 42
Fadale, J. S., Mar 22
Faris, W. A., Mar 72
Farnan, F. E., Feb 18
Farrell, Stanley M., Aug 62
Farrell, Thomas E., June 66
Fesus, Sam, Mar 74*
Filitti, Vito, May 56B
Fiscus, Wendell B., Jan., 63
Fisher, D. D., Oct 7
Fisher, William L., July 48
Fitzgerald, Lloyd C., Feb 18
Fleming, George T., Dec 56
Fletcher, B. J., June 66
Flowers, J. W., May 56B
Flynn, J. B., Aug 66
Ford, Robert W., Feb 18
Foster, David A., Dec 56
Foster, Harry W., Apr 74
Fountain, Paul J., Nov 68
Frazier, Earl A., July 10
Fryar, T. E., Nov 68
Fulton, George W., Jan 67

Gage, W. B., Mar 22
Gage, W. C., May 56B
Gagnebin, Albert P., Nov 67
Gaines, W. A., Jan 63
Gammon, C. A., Nov 10
Gaspar, C. J., Sept 82
Gebhardt, Elmer, W., Mar 18*; Sept 35*
Geiselman, F. R., May 14
German, J. G., Dec 56
Gilbert, A. N., June 14
Gilkey, W. Bradley, Feb 18
Gingerich, L. E., Jan 64*
Glenn, G. V., Apr 74
Gould, William W., Jan 67*
Gow, Robert A., Sept 83
Gracely, C. B., May 58
Graham, James G., Mar 74
Graves, D. C., June 66
Gray, W. Ashley, Jr., July 10
Green, Paul L., Jan 63
Green, V. L., Mar 22
Gregory, R. J., Apr 74
Grey, G. F., Aug 66

Hackney, T. P., Jr., Apr 74
Hagen, A. M., Mar 22; May 56B
Hallenberg, A. W., May 56B
Hammer, C. F., May 58*
Hammond, Robert S., Dec 60
Haney, D. F., May 14
Hanley, M. E., Aug 66
Hanly, Edwin C., Jan 64*; Sept 82
Hanna, C. W., Jan 67
Hansen, J., Mar 22
Hanson, Harold W., June 14
Harding, G. M., July 10
Harris, J. J., May 14
Harrison, W. M., Jr., Nov 10
Hart, W. J., May 14
Hartmann, E. George, Feb 18
Harvey, K. L., June 66
Hauer, E. R., Apr 74; May 58*
Haupt, Hans H., Jan 64; Sept 82
Hawks, L. H., Aug 66
Hawthorne, J. W., July 27*
Heister, Robert J., Sept 83
Helton, Gilbert B., June 14
Henderson, W. W., Apr 74; May 56B
Henrickson, C. A., Nov 10*
Henshaw, E. J., Feb 14
Heron, James H., Jan 63; Sept 35*
Herrold, R. F., Feb 18
Hewing, H. L., Sept 35*
Hicks, R. F., Jan 18
Hill, C. D., Sept 10
Hill, Gladstone C., June 66
Hoagland, Alfred, July 48
Hodgson, Edward H., Oct 60
Hogan, H. S., Feb 16
Hoglund, Gustav O., June 14
Holtman, William J., Aug 62
Hondlik, Robert J., Apr 76*
Hooper, R. W., Dec 57
Hope, O. L., Mar 22
Hopkins, D. T., July 10
Horstmeyer, Charles, Jan 63
Houser, Frederick N., June 8*
Houston, S. M., July 27*
Howell, R. C., Apr 74
Hudson, R. G., July 48
Hughes, Frank W., Dec 60
Hultgren, John T., May 60
Hultquist, F. Leonard, Dec 58
Hurley, Edward T., Sept 18
Hutchins, M. D., June 14
Hutson, John F., May 58

James, F. T., Feb 16
Janik, Clarence T., Jan 66*
Jarrett, Henry W., Nov 10
Jarvie, James, Apr 76*
Jeffrey, J. M., July 10
Jenkins, Richard R., Feb 18
Jennings, O. H., Mar 72
Johnson, G. H., Aug 62
Johnson, R. E., Dec 56
Johnson, Ralph O., Oct 7*
Johnson, W. I., Jr., Mar 22
Johnston, G. J., Mar 22
Johnston, Richard C., Feb 16*
Jones, A. E., May 44
Jones, E. M., Aug 66

Kadlic, John P., July 10
Kahler, George W., Dec 57
Kascal, W. F., Sept 18*
Keith, E. H., Mar 72
Keller, William M., Feb 14*; Aug 38
Kennedy, E. C., Nov 68
Kern, F. G., Dec 58
Kervin, J. H., Mar 22
Kettering, E. W., Oct 7*
Kissell, Carter, Mar 74
Klemp, J. R., Dec 56
Knack, Herbert A., Feb 18
Knott, Homer I., Aug 62
Koch, L. H., Mar 22
Koehler, Gordon F., Sept 84
Koob, Robert G., Nov 68
Koranda, Clarence J., Oct 60
Kramer, Charles O., Jan 64
Kubal, T. J., Mar 22
Kuhn, S. T., Sept 18*
Kuldell, Clarence E., June 14

Lake, G. F., July 10
LaPierre, Ruddy M., Feb 18
Larkin, Mathew L., Jan 63
Lasher, Maj. Gen. Edmund C. R., Mar 74
Lawson, A., May 14
Layton, James L., Nov 68
Leddy, Harry J., Oct 60
Leet, C. H., Aug 64*
Legg, L. M., Feb 58
Lembke, Lowell K., Apr 76
LeNoir, R. L., Jan 63
Leriche, C. C., Mar 39
Lever, Norman G., June 66
Lewis, O. O., Feb 14
Likens, P. O., Jan 63
Lingle, Eustace, Oct 7*
Lipscomb, C. M., Sept 35*
Lister, Edgar W., Nov 68
Lloyd, John H., Sept 18
Locke, E. W., June 14
Lockhart, Bliss E., Mar 22
Lockhart, C. H., Dec 56
Lodge, Stanley E., May 56B
Lofton, Edgar K., Nov 67*
Logan, J. M., July 10
Losch, M. H., May 56B
Lovell, Dana D., June 14
Low, Ernest C., Feb 18
Lowe, J. E., Mar 74
Lucas, P. J., Mar 22
Lukehart, H. P., Aug 62
Lyon, David M., Oct 7*

MacDonald, James A., Dec 60
MacDonald, K. E., Aug 66
Mackenroth, T. W., Dec 56
MacWhorter, E. L., Feb 18
Magnuson, R. E., Mar 22
Malenke, A. H., Feb 16
Mapp, Charles A., Aug 64
Mark, Robert D., July 10
Marsh, A. R., Sept 82
Marston, Donald F., Oct 7
Martin, I. W., May 56B
Martin, L. W., Sept 18
Martin, Larry E., July 10
Marye, R. W., May 56B
Matheson, Ben, Oct 60
Mauer, W. C., Oct 7
Maynard, C. C., Sept 35*
McBride, Frank, Apr 76
McCagg, H. L., Oct 7
McCarty, George W., Mar 74
McCrudden, James F., Jr., Nov 68
McElroy, Clarence W., July 10
McGowan, J., June 14
McGraw, William J., Jan 67*
McHenry, F. H., Feb 16
McKittrick, Warren E., Feb 18
McLaughlin, J. M., Apr 74
McLean, L. A., Sept 18
McLean, Ralph M., Jr., Dec 58; Dec 60
McNabb, Eugene, Mar 22
McQuarrie, Robert B., Nov 68
Melhado, John P., Feb 18
Meredith, E. W., July 10
Merrill, David G., Feb 14
Merrill, Jed J., Feb 18
Millard, M. D., July 48
Miller, Carl L., Oct 7
Miller, H. S., Oct 7
Miller, J. W., Nov 67
Miller, John H. W., Oct 7
Miller, John R., June 14
Miller, R. H., Aug 62
Miller, W. H., Feb 16
Miller, William C., Oct 7
Mills, Richard J., May 60
Mitchell, Robert R., Jan 63
Mizzi, John F., Jan 63
Molk, Herbert H., Sept 82
Montgomery, Josh, Oct 60
Moody, N. F., May 58
Moran, H. E., Aug 62
Morey, Arthur H., Oct 60
Morgan, H. R., Oct 7
Moriarty, Wilson H., May 56B
Morris, L. C., Nov 10
Morris, W. H., Mar 72
Morris, William S., June 66*
Moseley, W. V., June 14
Moser, E. J., Jr., Jan 63
Mouro, G. F., Jr., July 10
Mowers, W. H., Nov 68
Mowery, Robert B., June 14
Murphy, F. L., Jan 18; Oct 60
Murphy, Francis D., Jr., June 14
Murphy, W. R., Feb 18
Murray, Edward A., July 48
Mustard, James A., Jr., Jan 67
Mustard, Robert W., May 56B
Muth, Robert J., Oct 60
Myers, E. V., Oct 27*
Myre, A. J., July 10

Neil, R. M., June 14
Neiley, Richard Y., June 66
Nelson, H. V., Jr., July 10
Nelson, Harold M., Oct 7*
Newcomer, G. H., June 35*
Newman, Donnell W., Feb 18
Niemeyer, G. W., Mar 22
Norton, Ralph B., Mar 76

O'Connor, Arthur F., Aug 64
Odegaard, Harold T., Nov 10
Oehler, Alfred G., Apr 14*
Olds, William E., June 68*
Olender, Arthur L., Feb 18
Oliver, W. F., Jan 63
O'Neill, M. M., Aug 62
Onen, D. S., Dec 57
Ostrowski, J. E., Dec 58

Patterson, C. R., Oct 27*
Paul, Alfred, A., Feb 18
Pautke, William P., Mar 74
Peagan, A. T., Dec 57
Peronto, Fred, Feb 14*
Peters, L. H., Sept 35*
Peters, William, May 58
Peterson, T. B., May 58
Pettrey, J. E., Mar 72
Pettus, Thomas W., Nov 68
Pfaff, Otto A., Feb 18
Phelps, Harry I., Oct 7
Phillips, D. R., Aug 66
Pierce, Robert R., Aug 64
Pinkham, R. E., Sept 82
Pippinger, David W., May 56B
Pittman, Robert W., Aug 64*
Platt, Frank K., Feb 18
Plummer, E. T., Mar 72*
Pomeroy, Cleve H., Mar 74
Pond, C. E., July 32*
Poorman, S. L., Jan 66

Rabbeth, C. R., Mar 22
Radabaugh, D. A., May 56B
Ray, Robert R., Jr., June 14
Raynor, John T., Dec 57
Reavis, D. A., Jan 63; Mar 22
Riley, W. R., Sept 82
Rinehart, A. L., July 10
Rinehart, Robert T., May 60; Sept 83
Ringholm, A. J., Mar 74
Ristine, J. D., Sept 35*
Roberson, E. N., Dec 56
Robichaud, Roy A., Sept 82
Roblee, L. H. S., Mar 74
Robson, John L., Jan 63
Roe, Russell J., Feb 18
Rogge, William F., June 66
Rohr, Robert J., Dr., Dec 60
Rohrer, W. J., Dec 57
Ross, V. H., Nov 68
Rothfuchs, Oscar E., Apr 76
Rowland, Harry R., Feb 18
Ruble, Milton S., June 14
Rucker, B. J., July 10
Ryan, J. F., Mar 22

Sapp, J. F., Mar 22
Scallan, John W., July 10*
Scallen, Joel, Aug 66
Schlink, J. D., July 10
Schmidt, J. J., Aug 38*
Schneider, Harry E., Nov 68
Schneider, John, Sept 84
Schoedinger, E. H., July 10; Nov 10
Schorb, J. T., July 10
Schuette, Charles E., Dec 56
Schweinebraten, Walter G., Nov 10
Scott, Jack R., June 66
Segerstrom, Fred W., Mar 74*
Selb, George M., Nov 68
Seitz, C. R., Sept 82
Selby, Kenneth, May 58*
Selfe, R. G., Jan 64
Sell, Gordon K., May 58
Sellers, Hugh L., Jan 64
Shannon, Charles C., Mar 22
Shannon, H. F., Oct 7
Shaw, Charles E., May 56B
Sherard, Moffatt, Oct 60
Shults, Wilbur D., May 56B
Sieber, J. J., Jan 66*
Simpson, Robert V., Dec 58
Sims, John, July 10
Sittmann, Walter G., Feb 18
Skaaren, Julius G., Dec 58
Smith, George E., May 58
Smith, J. A. W., Jan 64
Smith, J. C., Dec 56
Smith, Jesse H., Dec 56
Smith, M. E., July 10
Smith, R. A., Dec 56
Smyth, John R., Apr 76
Sofford, James H., Aug 62
South, William D., Jr., Apr 76
Souther, George L., Jr., June 14; Nov 10
Sparks, K. C., June 66
Spencer, L. A., July 10
Spillan, C. B., Aug 62
Spurgin, R., Aug 66
Stanton, L. A., Oct 27*
Stark, E. F., Jr., Apr 74
Steele, F. B., Feb 18*
Stevens, Geoffrey W., May 14
Stevenson, Carrold, Feb 16
Stevenson, Mellor W., May 58*
Stevenson, William M., July 48
Stewart, E. T., Jr., Nov 10
Stewart, Gordie, July 10
Stiner, Glen F., Aug 62
Stone, Windsor, Jan 63
Strayhorne, George V., May 56B
Stremmel, Frank H., Feb 14*
Strobeck, Leonard C., Oct 60*
Stubbs, Charles M., Dec 56
Stultz, W. L., Jan 63
Suess, Paul A., Mar 74
Sullivan, W. P., Apr 74
Swaney, L. L., Aug 66
Sweetin, N. C., Apr 74
Sweigart, R. Dale, Aug 66

Talbert, Donnis L., Aug 64
Tausch, Richard G., Feb 16
Taylor, A. O., Oct 7
Taylor, Evans, Nov 10*
Teeter, O. D., Sept 35*
Templin, Kenneth E., Mar 74
Terrell, Richard L., Apr 76
Thomas, C. A., June 68; Oct 60
Thomas, J. H., Apr 74
Thompson, Harry E., Feb 18
Thompson, R. E., Mar 72
Thompson, S. A., Nov 10*
Thompson, W. M., June 66; Sept 82
Thornbury, D. H., June 68
Thruelsen, Gordon F., Mar 72*
Tomlinson, R. T., Feb 16; July 10
Townsend, Louis V., Apr 74
Tozer, H. V., Mar 22
Tullis, John, Oct 60
Turnbull, R. P., Sept 18
Turner, Harry S., Oct 7

Updike, F. T., Feb 18

Van Gorkom, J. W., June 66
Van Horne, Philip B., Nov 68
Van Schaick, Frank L., Dec 56
Vardaman, John I., Jr., Oct 7
Vaughan, J. E., Nov 68
Venable, B. D., Dec 56
Venrick, Charles F., May 58*
Vise, H. M., Jr., Dec 56

Waddington, R. S., May 14
Wagner, Charles A., Aug 6(
Wagner, W. W., Aug 66
Wall, E. G., Sept 18
Wallace, Donald J., July 48
Wallace, William W., June 14
Wallendorf, R. W., Mar 22
Waller, Robert E., Nov 68
Walston, Earl L., Jan 18
Wanberg, Martin, Dec 56
Ward, J. J., Dec 57
Warheit, Lewis H., Feb 16
Warren, Herbert H., Sept 83*
Warren, M. C., Mar 76
Wason, Stowell C., May 58
Wassell, Raymond P., Oct 60
Waters, A. L., July 10
Waterworth, V. L., Oct 7
Weaver, G. R., Sept 82
Webb, G. S., Sept 82
Weeks, Robert H., Jr., Jan 67
Weigman, E. H., Nov 10
Weight, John W., Aug 64
Wethofen, G. J., Mar 74
Weldon, Joseph M., Nov 67
Wellington, R. H., July 48
Welsch, J. A., Sept 35*
Welty, William H., Nov 68
Westbrook, A. T. G., Sept 18
Wheeler, R. A., July 42
White, Lawrence P., July 10
Whitehurst, Roland, Dec 58
Whitenight, D. R., Jr., May 56B
Whitesell, George O., Nov 68
Whyte, H. M., Dec 56
Wickman, Donald R., May 60; Sept 84
Wiggins, C. N., Mar 22
Wilcox, Harold C., June 8*
Wild, H. G., Nov 68
Wildes, F. R., Sept 82
Williams, Fred, Dec 56
Williams, W. O., Aug 66
Williamson, D. O., Jan 66
Wilson, Arthur E., Sept 84
Wilson, Fred T., Jr., Nov 68
Wilson, M. R., Sept 18
Wilson, Dr. Thomas L., Sept 83
Winsted, W. L., Sept 18
Wolfe, C. J., June 14
Wood, Albert L., June 14
Wood, David D., Feb 18
Wood, G. L., Mar 22
Wood, H. M., Sept 82*
Wood, Harold L., Feb 16
Woodard, Alton C., Aug 62
Woodworth, H. C., Feb 16
Wooten, A. L., July 10
Wright, Calvin L., Nov 68
Wright, H. P., Aug 38*
Wylie, Laurence, Sept 70
Wyrough, Hugh M., Apr 74

Yearley, B. C., May 58
Yonge, Jackson B., June 14

Zeider, Gordon L., May 56B
Zydor, Heinz P., Jan 63

OBITUARY

Acworth, J. S., July 48
Bailey, Easley B., Jan 64
Barnes, E. C., Oct 7
Barrett, C. E., Feb 16
Benkendorf, C. G., Nov 10
Brooks, J. Gardner, Aug 66
Coleman, John D., Oct 60
Conway, J. V., Dec 60
Craft, D. R., Dec 57
Dunn, S. O., Feb 18*
Ellicott, Charles R., Jan 66
Freeman, Lewis D., Feb 16
Glenn, James D., June 68
Hall, Lyle G., June 68
Jackson, John, Apr 74
Kinnaw, C. E., Oct 60
McGruer, A. E., May 14
Morris, John P., Apr 74
Muchnic, Harry E., Sept 84
Owens, Carlton F., June 68
Petersen, A. H., Mar 72
Slottman, George V., June 68
Swanson, Frank J., Feb 18
Winkler, Richard C., Oct 60

NEW PUBLICATIONS

AAR Lube and Fuel Oil Test Manual, Apr 18
AAR Specifications for Tank Cars, Dec 8
ASTM Standards on Coal and Coke, Jan 18
ASTM Standards on Petroleum Products and Lubricants (D-2) Apr 18
Aluminum Sheet and Plate Information, Apr 18
Insulation Engineering Fundamentals, July 10
Manual on Measurement and Sampling of Petroleum and Petroleum Products, July 10
New Welding Symbols, Dec 8
Refrigerator Car Research, Dec 5
Safety in Welding and Cutting, July 10
Symposium on Railroad Materials and Lubricating Oils, Apr 18
Test Code for Diesel and Burner Fuels, May 14
Welding Handbook, Nov 10

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TIME-SAVING IDEAS FOR **JANUARY 1958**

Volume 132 • No. 1

MOTIVE POWER AND CAR

How Stabilized Employment Saves Money for Lehigh Valley 23

Annual budgets and advanced planning play a big part in enabling the LV's mechanical department to control costs and meet today's pressing problems.

New Look for Santa Fe's "Victory Gons" 27

This railroad's "war babies" have been put into condition for many more years of service by applying new floors and sides.

How N&W Reclaims Its Lubricators 28

A problem facing all railroads in light of the mandatory application of journal lubricating devices is being met with two specially equipped reclamation plants.

Heliarc Face-Lifting Modernizes C&EI Passenger Cars 30

Reduced maintenance and better appearance both result from road's program of substituting stainless steel sheathing for surfaces formerly needing paint.

Bad Orders Don't Wait 32

An additional shift and lighting for night operation make a big difference in the operation of the RF&P's newly built rip track.

ELECTRICAL

UP 8,500-Hp Turbines Ready to Roll 33

Steam locomotives will be retired and replaced by gas-turbine-electric locomotives with higher horsepower-per-ton ratio to handle high-speed, long distance freight.

Roll Them Out Like New—Part 6 37

Clean electrical equipment is essential to satisfactory performance and low maintenance costs. This is the concluding installment of a three-part chapter on cleaning.

When Amps Go Up, Volts Go Down 42

Some practical information on why transition is used to limit voltage and current values on a diesel-electric locomotive.

Operating Difficulties That Can Appear to Be Brush Troubles 49

Things are not always what they seem, but a little experience and knowledge will disclose their true identity.

DEPARTMENTS

What's New in Equipment	10	Problem Page	56
Report	16	Questions and Answers	60
Personal Mention	18	Supply Trade Notes	64

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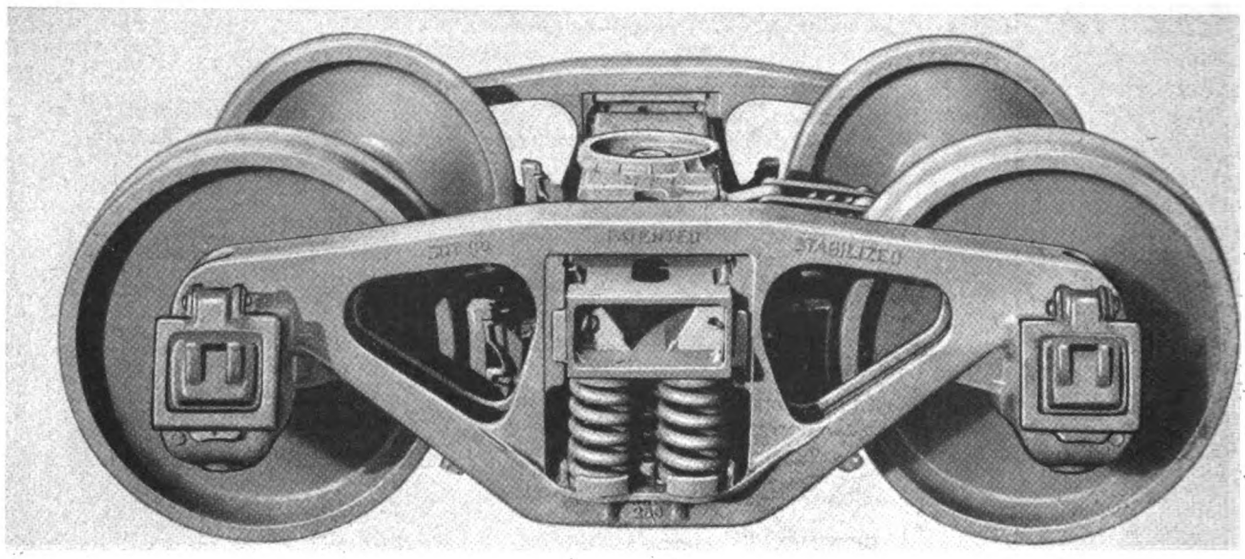

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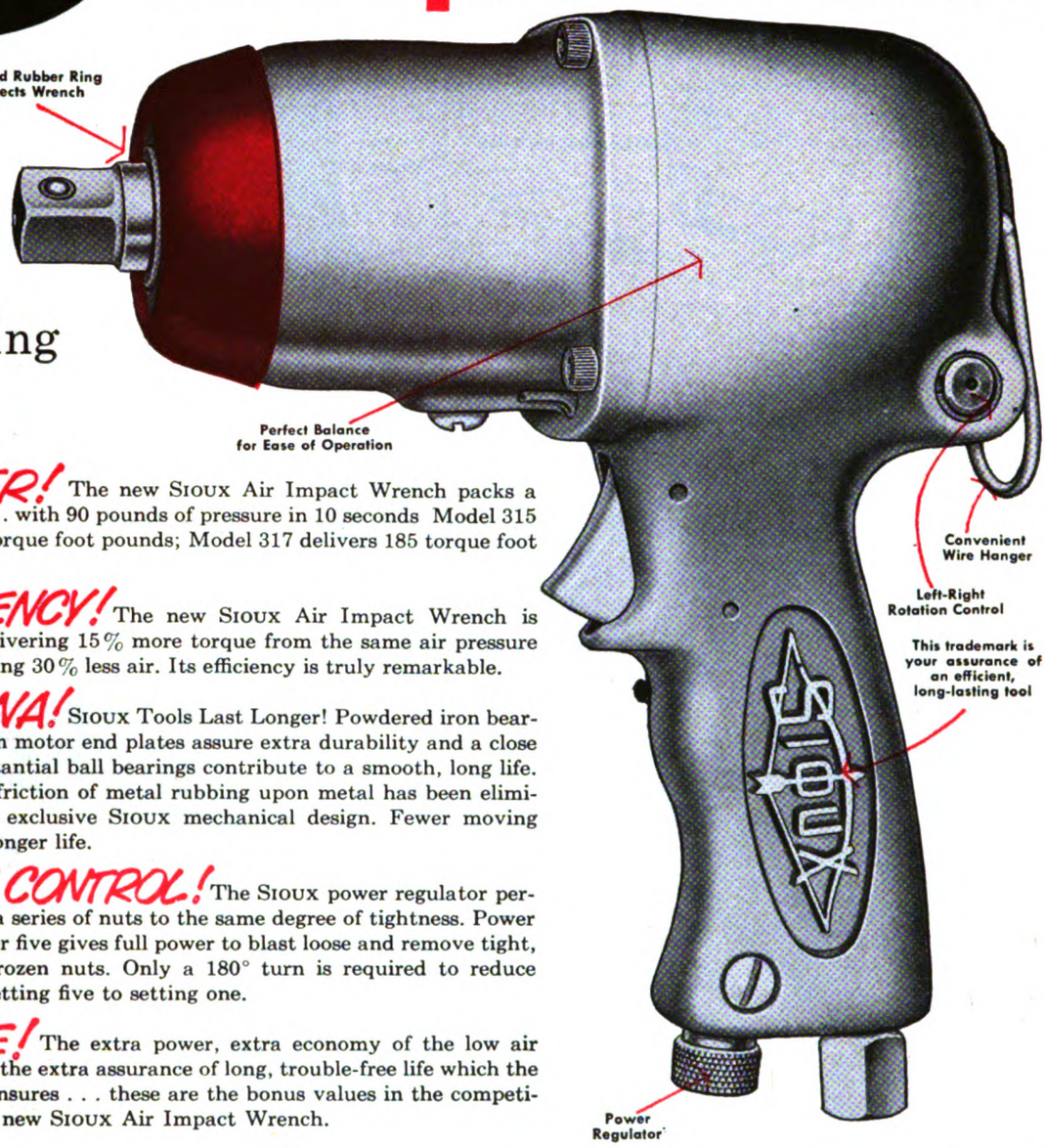
A name that means something



IN POWER! The new SIOUX Air Impact Wrench packs a real punch! . . . with 90 pounds of pressure in 10 seconds Model 315 delivers 130 torque foot pounds; Model 317 delivers 185 torque foot pounds!

IN EFFICIENCY! The new SIOUX Air Impact Wrench is capable of delivering 15% more torque from the same air pressure while consuming 30% less air. Its efficiency is truly remarkable.

IN STAMINA! SIOUX Tools Last Longer! Powdered iron bearing surfaces on motor end plates assure extra durability and a close air seal. Substantial ball bearings contribute to a smooth, long life. Much of the friction of metal rubbing upon metal has been eliminated in this exclusive SIOUX mechanical design. Fewer moving parts assure longer life.

IN TORQUE CONTROL! The SIOUX power regulator permits running a series of nuts to the same degree of tightness. Power setting number five gives full power to blast loose and remove tight, rusted, and frozen nuts. Only a 180° turn is required to reduce power from setting five to setting one.

IN VALUE! The extra power, extra economy of the low air consumption, the extra assurance of long, trouble-free life which the SIOUX name insures . . . these are the bonus values in the competitively priced, new SIOUX Air Impact Wrench.

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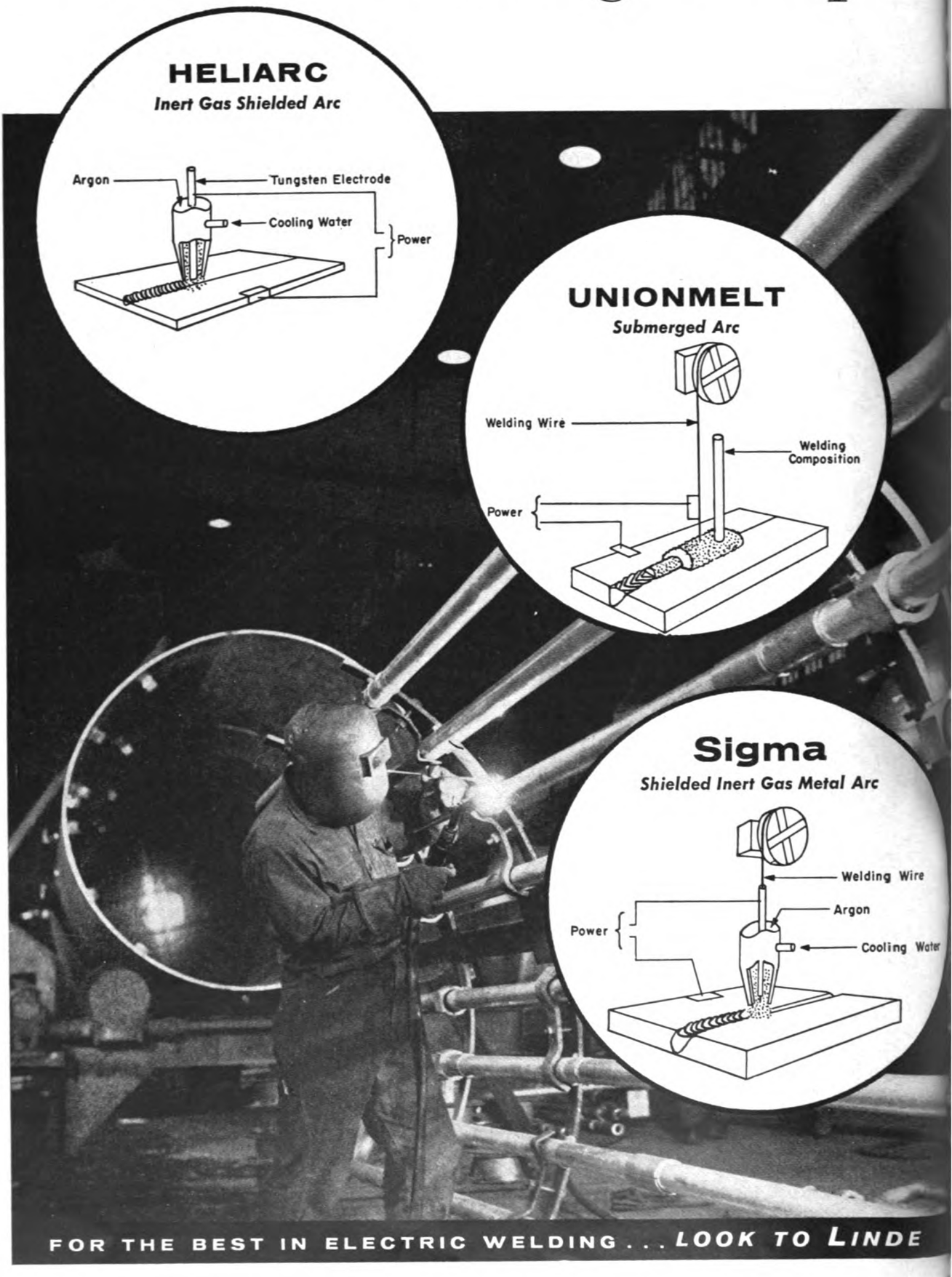
SPECIFICATIONS

Wrench Number	315	317
Cap. Bolt Size	⅝"	11/16"
Torque foot pounds at 120 pounds air pressure in 10 seconds	195	235
Length	7⅛	7⅛
Side to Center	1 7/16	1 7/16
Socket Drive	½ Sq.	⅝ Sq.
Average air consumption	3½ Cu. Ft.	3½ Cu. Ft.
Net Weight (tool only)	5½ lbs.	5½ lbs.

From Car Building to Repai



LINDE provides the *right welding method!*

Inert gas shielded arc welding—

HELIARC Welding is helping railroads save up to 88% of new rolling stock cost by simplifying and speeding many car fabrication jobs. This process, using a tungsten electrode and a shield of LINDE argon, is tops for joining hard-to-weld commercial metals. HELIARC Welding produces high-quality welds that resist corrosion and eliminate costly grinding and finishing.

Submerged arc welding—

Big savings in time and materials in the fabrication and reconstruction of all types of rolling stock are made possible with UNIONMELT Welding. Materials ranging from light gage to heavy plate, adaptable to mechanization, can be most economically joined by UNIONMELT Welding. UNIONMELT Welding is also used extensively for resurfacing metal, providing extra wear and corrosion resistance.

Shielded inert gas metal arc welding—

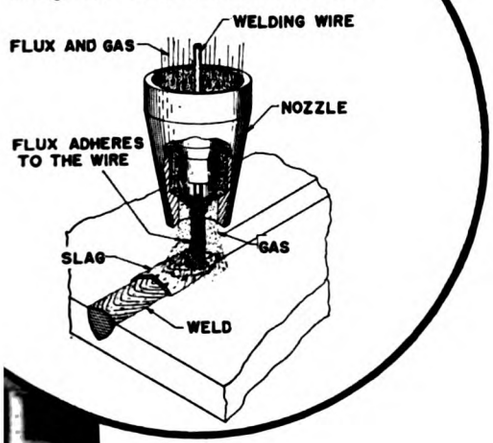
One of the most versatile welding methods for railroad car fabrication is Sigma Welding. LINDE's Sigma apparatus, using a shield of LINDE argon, is ideal for manual welding of commercial metals ⅛ in. or more thick, and for automatic operation on lighter gage metals to .050 in. Highest quality welds can be made on aluminum thicker than ⅛ in. at speeds up to 16 inches per minute. Build-up and surfacing jobs are also improved by using LINDE's Sigma welding method.

New! Magnetic flux gas shielded arc welding—

UNIONARC Welding, LINDE's latest contribution to the railroad industry, is an extremely fast method for welding mild steel. This method employs a continuously-fed, bare steel wire electrode, magnetically coated with flux conveyed in a stream of carbon dioxide shielding gas. Manual welds can be made easily in any position—vertical, overhead, downhand—with no stops to change electrodes. The speed, versatility, and ease of operation of UNIONARC Welding brings costs down 25% to 65% below those of manual covered electrode welding. Clean, smooth, high-quality welds are provided, even in the presence of moderate amounts of rust, scale, and moisture.

UNIONARC

Magnetic Flux Gas Shielded Arc



LINDE engineers have worked with railroad men for many years designing, developing and testing electric welding methods and apparatus . . . to improve road maintenance, equipment repair and shop fabrication. This wealth of experience is yours for the asking. Just call your nearest LINDE office.

LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. *In Canada:* Linde Company, Division of Union Carbide Canada Limited.

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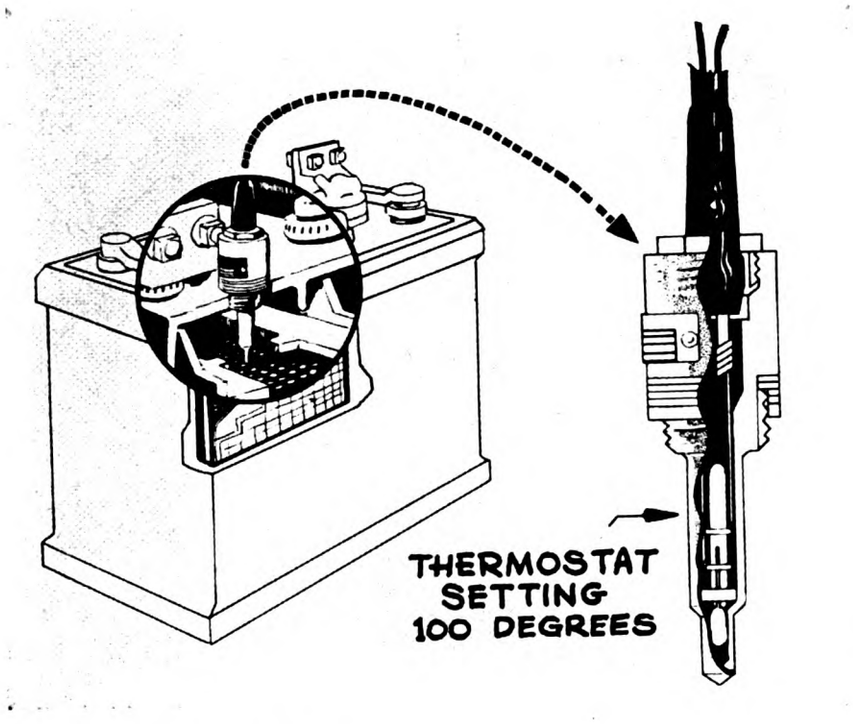


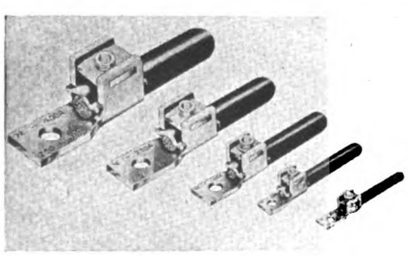
Battery Thermostat

This battery temperature control is said to prolong the life of lead acid storage battery sets by keeping the electrolytic solution from over-heating due to high charging rates.

It consists of two parts, a Vapor mercury contact thermostat set at 100 deg F and a dust-proof bottle relay housing the relay contacts, the only moving parts in the control. The non-corroding thermostat tube is enclosed in a transparent lucite housing which is threaded through an opening in the top of a centrally located battery in set. The sensing end dips into battery solution about two inches. When battery solution temperature reaches 100 deg, thermostat contacts close the relay circuit, this in turn closes a bridge around a portion of the voltage regulator resistance unit. The battery continues to be charged at maximum allowable rate possible while battery solution is at 100 deg, the control point.

Relays are available for 32-, 64- and 110-volt battery systems. Thermostats are 3⅝-in. long and weigh 6½ ounces.

The housing is threaded and fitted for a two conductor lead. *Vapor Heating Corporation, Dept. RLC, 80 East Jackson blvd., Chicago 4.*



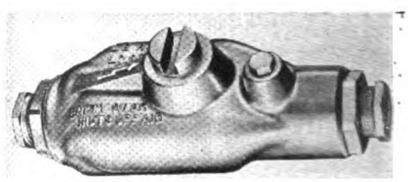
Pressure Type Cable Lugs

Socket type set screws feature the 55 to 515 amp "wide-range" pressure lugs for electrical installations illustrated. The cadmium plated lugs are designed for use in entrance switches, service troughs, panel boards, shallow housings and confined areas where bolt head projections present an installation problem.

Tightening socket, guide pad and contact pad are made of case hardened steel to assure lock-tight maximum pressure against the conductor wedged in the bottom of the assembly. Positive conductivity is provided by the copper formation of the wire trough and large contact area of the lug unit. *National Electric Products Corporation, Dept. RLC, Pittsburgh.*

Suspension Balancers

Two new streamlined suspension balancers, featuring Thor's automatic "no drop" safety brake for the safe handling of air and electric tools, inspection gauges, welding and other equipment, have been introduced. Model 5LB6 will suspend loads up to 5 lb; Model 10LB6 is designed for equipment weighing 1 to 10 lb. Both have full swivel upper hook, with auxiliary suspension for safety. Spring-reel cable devices hold equipment at operating levels. *Thor Power Tool Company, Dept. RA, Prudential Plaza, Chicago 1, Ill.*

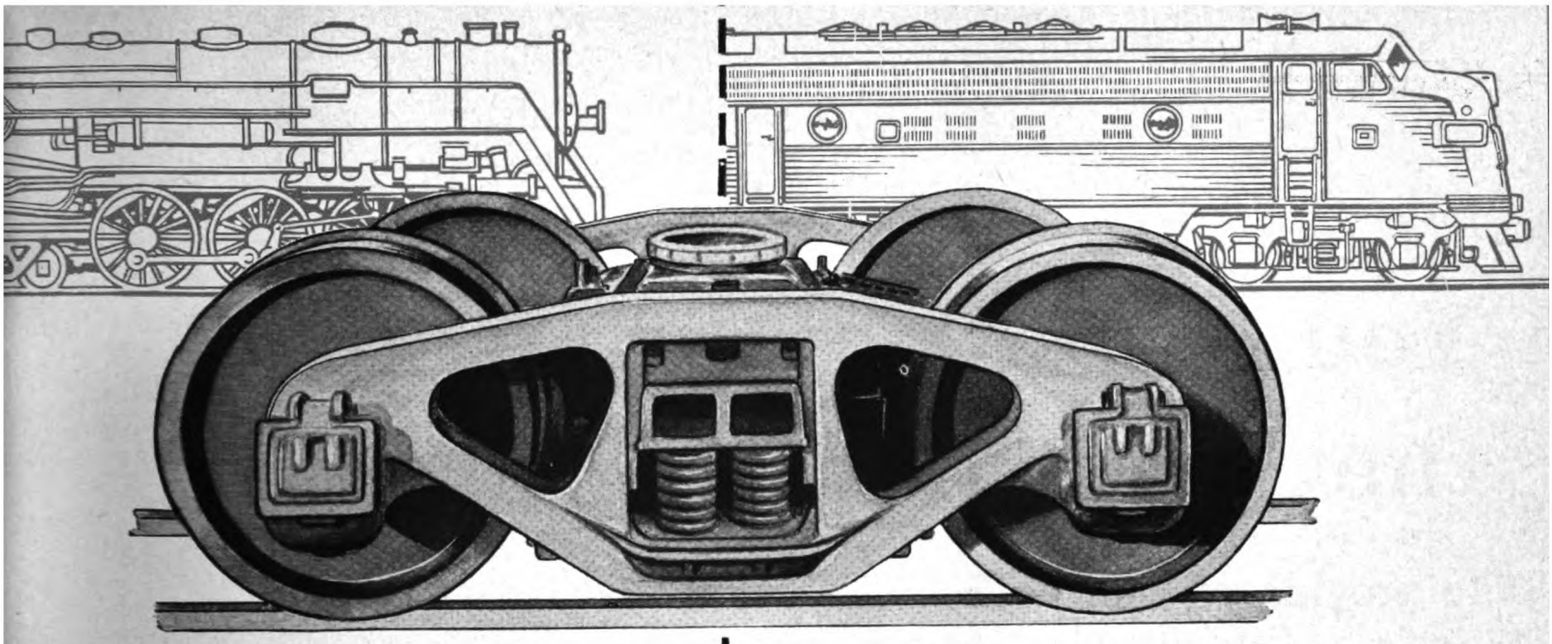


Automatic Line Oiler

The LO380 automatic line oiler shuts off the air supply in air tools when the oil is used up. It is light in weight, easily adjusted, and refillable while in use. The positive type oil pickup feeds oil the instant drilling starts. Its one-pint capacity is more than adequate for one shift of operation. The oiler prevents waste of excessive oiling due to inadequate adjustments of conventional line oilers, and oil flow can be adjusted without shutting off air pressure.

The oiler body is aluminum, weighs 9 lb, and is of streamlined design. Its

(*Continued on page 68*)



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A Great Step Forward!

With waste gradually being discontinued in journal lubrication, the change-over to a better type of lubricator raises certain questions: what type should it be; what qualities should it possess; what kind of a performance should be expected of it? To help you decide, consider what the JBS Acme Lubricator offers and compare it with any other lubricator. JBS Acme alone has the exclusive all-wool quilted core* which retains many times its own weight in oil reserve. Heavy chenille loop pile surfaces assure an ample supply of filtered oil at all times. JBS Acme Lubricators are unaffected by temperature changes and wick AAR specification car oil even at 45° below zero in road service tests. JBS Acme Lubricators require no modification of the standard journal box, are designed to hold their position in the box, and assure better performance with less servicing.

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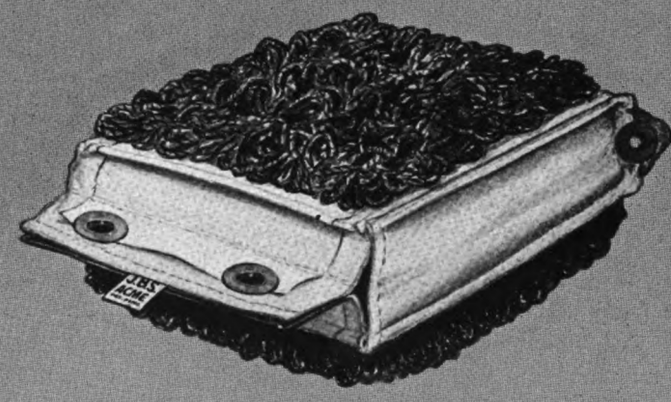

- ★ Retains oil up to 4 times its own weight
- ★ Requires no modification of journal box
- ★ Wicks AAR specification car oil even in coldest weather
- ★ Assures better performance with less servicing
- ★ Has exclusive all-wool quilted core*
- ★ Reinforced for extra wear
- ★ Cannot glaze
- ★ Readily reclaimed

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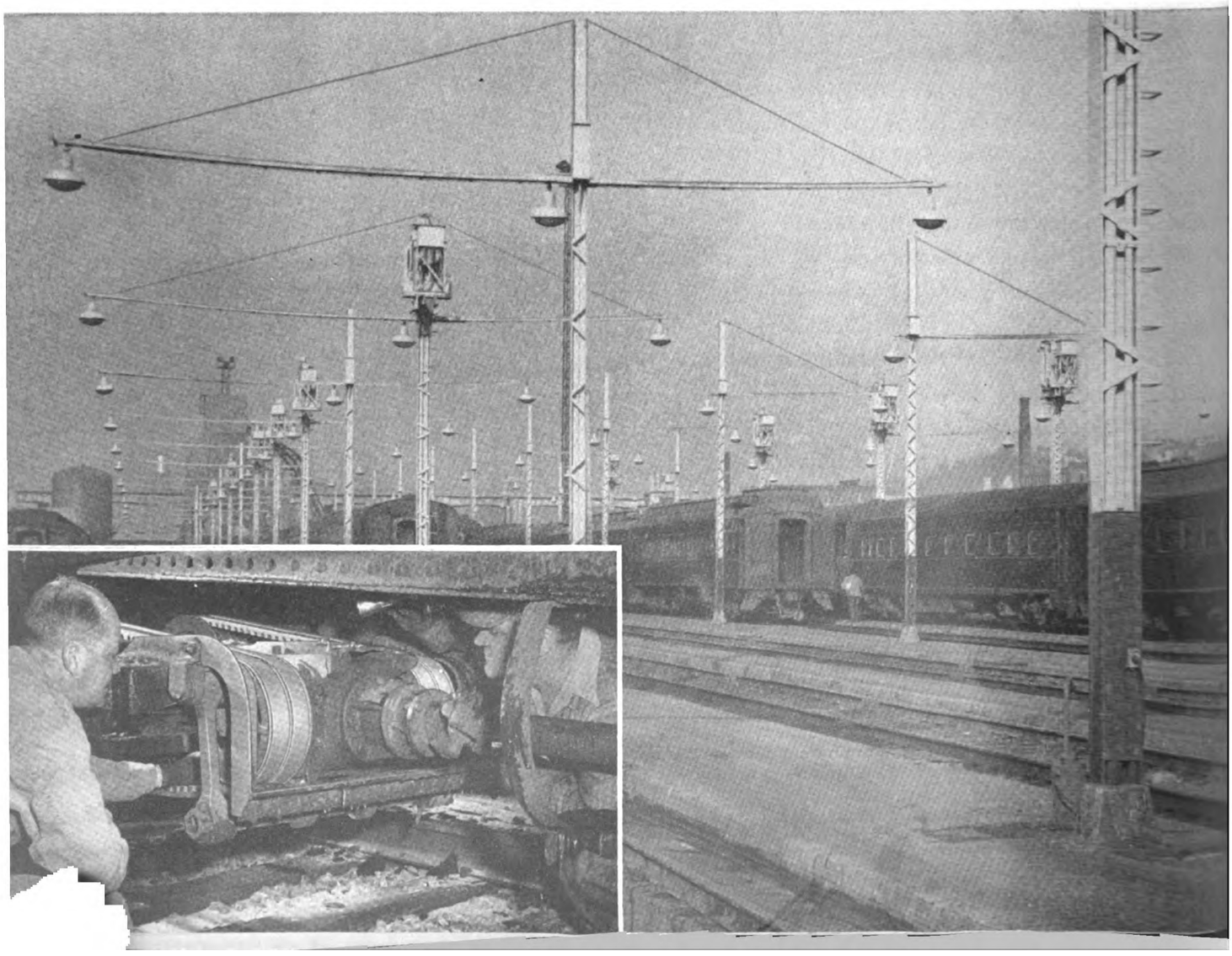
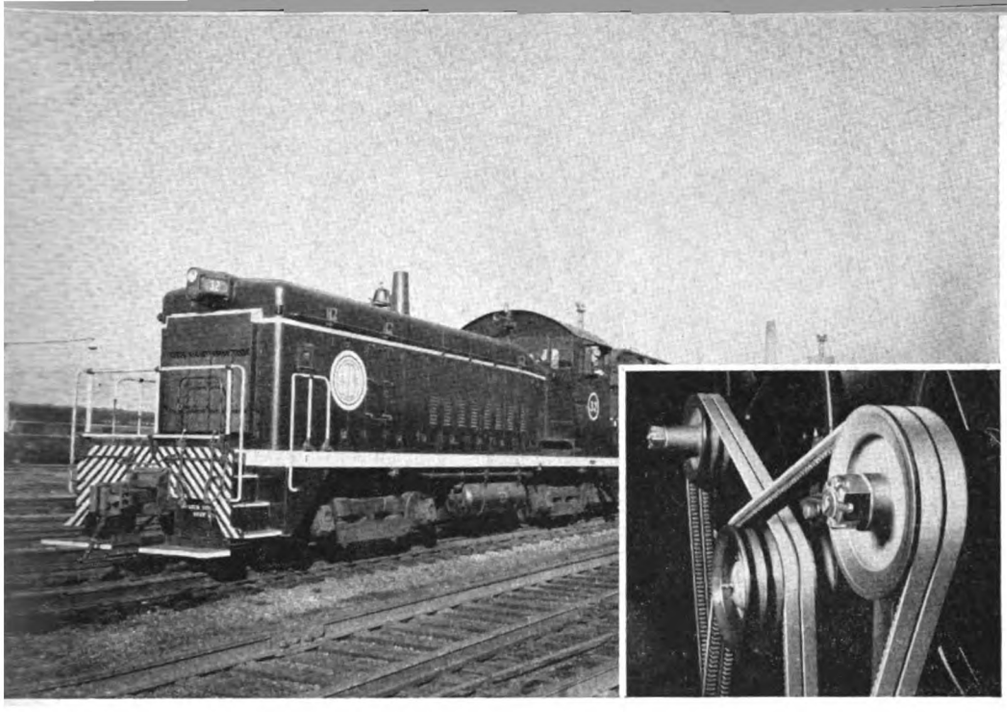
to provide efficient, economical V-Belt drives for positive, steady electrical power on your trains

He sees your V-Drive problem first hand. With the help of your electrical and mechanical engineers, he works out the best solution for that problem, specifies the proper Dayton equipment and sees that it is delivered and correctly installed. When your V-Drive is working at top efficiency, providing the positive power, dependable service, and economical operation always supplied by Dayton V-Belts—his work is only half finished. Then he begins a periodic check on your Dayton-equipped drives—at various stages of operation—under all weather and road conditions.

Experienced Dayton Field Engineers are always available, across the country, to serve you better through the application of the best in technical knowledge and V-Belt equipment. Write Dayton Rubber Co., Railway Division, Dayton 1, Ohio, for complete information.





When your Dayton Field Engineer specifies Dayton V-Belts, he assures you the best possible V-drive operation. Dayton V-Belts are on more cars than all other makes of V-Belts and are specified as original equipment on 90% of all new Diesel locomotives.

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World's Largest Manufacturer of V-Belts

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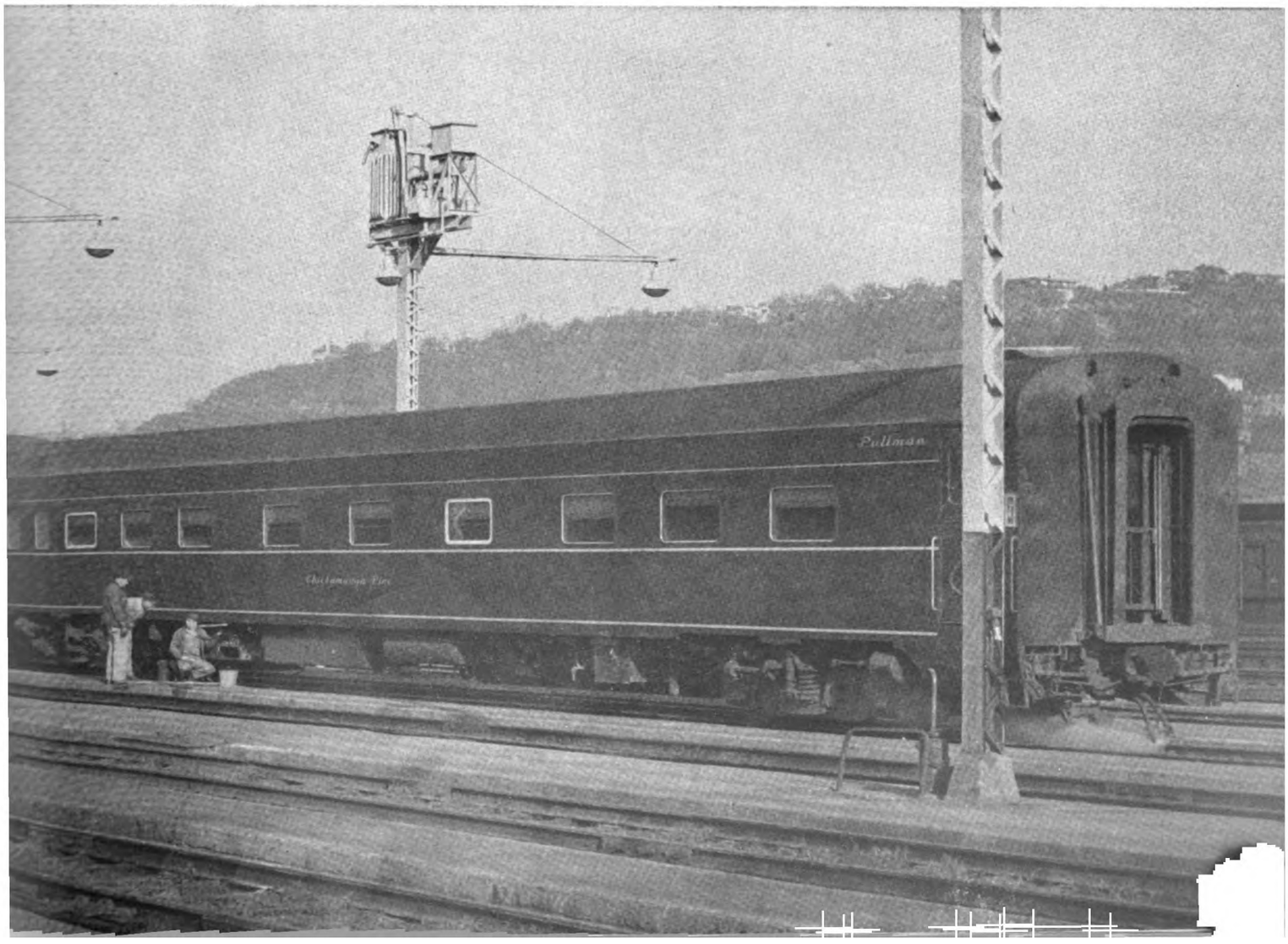

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All ASF Extended Life Springs are shot-peened—which cold-works surfaces and more than doubles the life of the spring.

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A new heat-treating process makes ASF Extended Life Springs far better able to maintain load-carrying capacity—without permanent set.

3. Lower Cost

ASF Extended Life Springs are now available at no increase in cost over conventional springs. Because they last over twice as long, they cut your spring costs per car mile.

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LOCOMOTIVES AND CARS REPORT FOR DECEMBER

Orders and Inquiries for New Equipment

Placed Since the Closing of the December Issue

Diesel-Electric Locomotive Orders

Road and builder	No. of units	Horse-power	Service	Other detail
CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC:				
Electro-Motive	10	1,750	Road switching	——
DULUTH, MISSABE & IRON RANGE:				
Electro-Motive	28	1,750	Road switching	Approx. unit cost, $245,000. For delivery before start of 1958 ore shipping season. Purchase of 36 additional units contemplated over next two years.
ILLINOIS CENTRAL:				
Electro-Motive	70	1,750	Road switching	GP-9's. Estimated cost, $12.5 million. Delivery by February 1.
NORTHERN PACIFIC:				
Electro-Motive	31	1,750	Road switching	- ——
	15	1,200	Switching	- ——
Alco Products	12	1,800	Road switching	- ——

Freight-Car Orders

Road and builder	No. of cars	Type of car	Cap., tons	Other detail
CANADIAN PACIFIC:				
Canadian Car	300	Gondola	—	- ——
	200	Stock	—	- ——
National Steel Car	475	Triple hopper	—	Cost to exceed $4,000,000.
BESSEMER & LAKE ERIE:				
Thrall Car	1	Flat	125	Cost, $40,000 each. April delivery.
	1	Flat	135	Cost, $40,000 each. April delivery.
CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC:				
Bethlehem Steel	55	Gondola	55	- ——
General American	50	Covered hopper	70	"Airslide."
CHICAGO, ROCK ISLAND & PACIFIC:				
American Car & Fdry.	10	Covered hopper	70	Unit cost, $10, 725. For February delivery.
DETROIT & MACKINAC:				
General American	25	Hopper	70	Delivery second quarter 1958.
ERIE:	6	Depressed center flat	140	58 ft 4 in. long.
Company shops	1	Depressed center flat	200	72 ft 6 in. long. Seven cars for second quarter 1958 delivery.
GEORGIA:				
American Car & Fdry.	75	Hopper	70	Estimated cost, $682,000. February delivery scheduled.
ILLINOIS CENTRAL:				
American Car & Fdry.	200	Covered hopper	70	Approx. cost, $2,000,000. 100 to be twin hopper; 100, triple hopper.
LOUISVILLE & NASHVILLE:				
Pullman-Standard	475	Box	—	Approx. cost, $4,400,000. Delivery to begin this month. Included are 225 40-ft cars with roller bearings, nailable steel floors and 8-ft doors, and 250 cars with friction bearings and wood floors.
MERCHANTS DESPATCH TRANSPORTATION CORP.:				
Pacific Car & Fdry.	50	Refrigerator	40	Est. unit cost, $12,295. April delivery expected.
MIDLAND PROPERTIES CO.:				
Pullman-Standard	5	Box	50	Unit cost, $8,350. Delivered in December.
NORTHERN REFRIGERATOR LINE:				
Pacific Car & Fdry.	100	Refrigerator	40	Est. unit cost, $12,295. April delivery expected.
WESTERN OF ALABAMA:				
American Car & Fdry.	25	Hopper	70	Estimated cost, $227,000. Delivery expected in February.

Passenger-Train Cars Orders

Road and builder	No. of cars	Type of car	Other detail
NORTHERN PACIFIC:			
Pullman-Standard	10	Baggage	Cost, $802,500. Second quarter delivery expected.

Inquiries and Notes

FREIGHT CARS:

Minneapolis & St. Louis—Will soon begin installation of Evans DF equipment at its Marshalltown, Iowa, shops.

Louisville & Nashville—Will install roller bearings on 230 passenger-train cars, including 120 baggage cars, 30 combination baggage-mail cars, and 30 coaches, at its South Louisville, Ky., shops at a unit cost of approximately $3,000.

RR Conference Will Be In Cleveland Next April

A railroad technical conference will be conducted jointly by the Land Transportation Committee of the American Institute of Electrical Engineers and by the Railroad Division of the American Society of Mechanical Engineers in Cleveland on April 9 and 10. Papers for the first day of this two-day meeting will be contributed by AIEE members; ASME papers will be presented the second day.

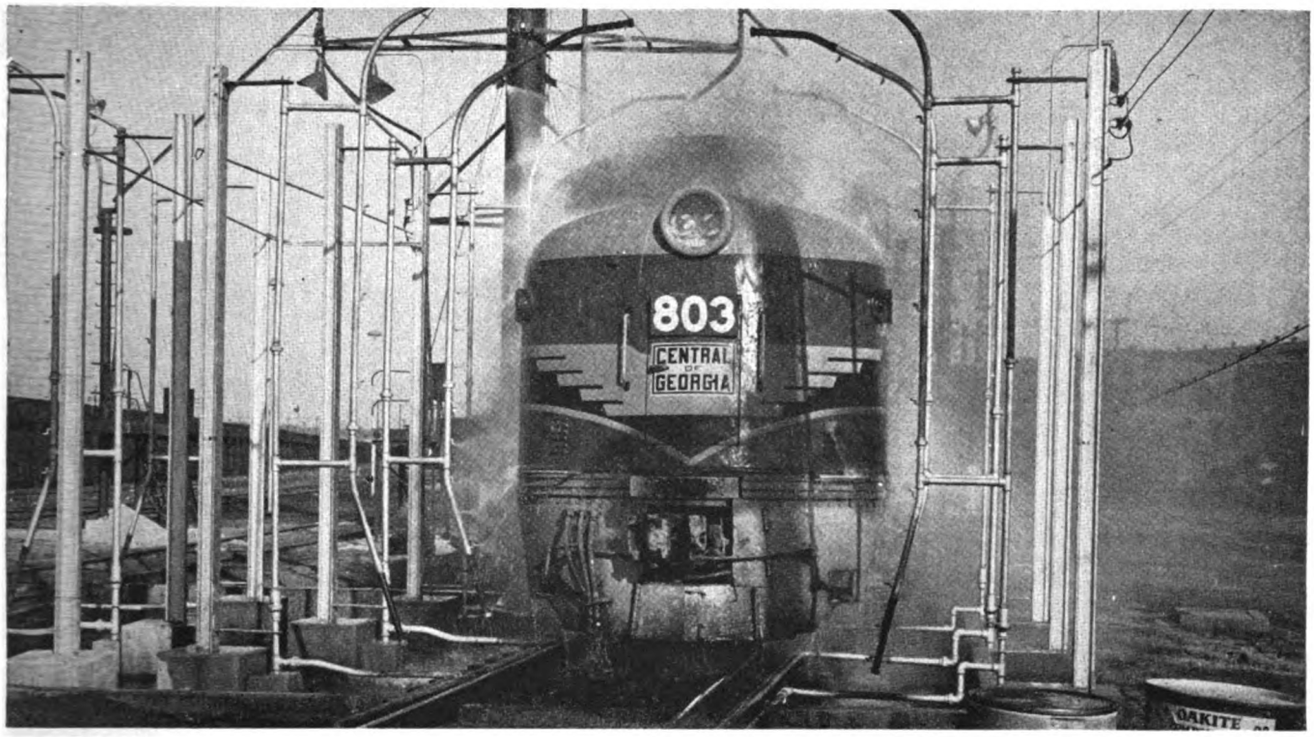
Details of this meeting were announced by division chairman F. K. Mitchell at the annual railroad luncheon held in conjunction with the meeting of the ASME Railroad Division in New York early last month. The speaker was ICC chairman Owen F. Clarke who called for railroads to speed up their scientific effort. "There is a corollary between the recent national experience," declared commissioner Clarke, "and the present situation confronting the railroads." Apparently referring to Soviet accomplishments, he warned that "we must institute crash programs' to speed up technology.

"To my mind the primary challenges confronting you, and to which transportation crash programs should be devoted, are the same old demands for passenger and freight services which are not being fully met. There's nothing new

(*Continued on page 18*)

Summary of Monthly Hot Box Reports

Month	Cars set off between terminals with Hot Boxes: System	Foreign	Miles per car set off
September 1953	6,083	10,195	173,376
September 1954	6,740	8,882	167,355
1955			
September	5,896	10,469	178,649
October	3,966	7,182	271,564
November	2,010	3,972	493,184
December	1,819	3,774	522,444
1956			
January	2,029	4,302	462,029
February	2,570	5,611	341,542
March	2,517	6,212	346,853
April	3,202	6,881	290,626
May	4,672	10,903	196,688
June	6,777	15,125	135,774
July	8,484	16,067	113,573
August	9,891	16,892	113,474
September	6,834	12,629	149,970
October	4,357	8,429	243,505
November	2,650	5,560	359,759
December	2,256	4,436	438,425
1957			
January	3,373	6,121	291,453
February	3,272	6,844	264,538
March	3,164	6,687	307,306
April	3,949	8,447	228,493
May	6,580	12,691	154,387
June	8,285	16,277	115,749
July	10,438	18,819	96,064
August	9,662	17,639	109,839
September	6,736	12,066	147,694

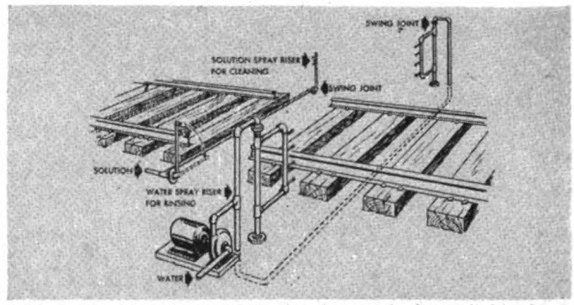


Original pressure-spray cleaning by Oakite cuts equipment-washing costs

Almost TEN years ago, Oakite FIRST pioneered the so-called pressure-spray system of cleaning and rinsing locomotive running gear and passenger cars. Today, many leading railroads are using this dependable Oakite system as standard procedure.

Above, you see the Oakite system in action. This sturdy washing unit was built to specifications from Oakite blueprints. Entire unit was fabricated in the railroad's own shops.

Today, you can cut your equipment-washing costs by specifying Oakite pressure-spray cleaning and rinsing systems and by selecting any one of a wide variety of specialized Oakite cleaning compounds.



One of the typical automatic cleaning methods available from Oakite.

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RAILWAY DIVISION

(*Continued from page 16*)

in the challenges themselves," Mr. Clarke stated. "People want to travel faster, more comfortably, safer and at a reasonable cost.

"Shippers want to move freight farther more dependably, with less bother—and at a reasonable cost." Automation may be one of the answers for the railroads in seeking to meet the challenges they face as the commissioner sees it. To him, railroading seems the type of transport "most susceptible to improvements in productivity" through developments in this area. Technical men have a responsibility, he asserted, to know traffic and other problems and "to sell management on how your ideas will improve overall service."

F. L. Murphy, vice president, Pullman-Standard, assumed the position of ASME Railroad Division chairman for 1958 at the December meeting.

1957 Car Orders Top Previous Year

Orders for domestic freight cars placed in 1957 ran 10.9 per cent ahead of the 1956 figures through the end of November. Car deliveries boomed in 1957. Since World War I, only the totals of 1948, 1925, 1924 and 1923 were greater than the 1957 delivery totals.

Orders and deliveries of domestic equipment reported by the American Railway Car Institute through the first eleven months showed the following:

	1956	1957
Car orders:		
Car builders	27,205	19,900
Railroad shops	7,866	19,048
Total	35,107	38,948
Car deliveries:		
Car builders	38,230	52,704
Railroad shops	21,590	40,187
Total	59,820	92,891

Pennsylvania President J. M. Symes warned recently that railroads "need to order 85,000 to 100,000 new freight cars a year for each of the next ten years just to correct obsolescence and increase our fleet." Orders placed during each of the past two years were less than half of the annual figures suggested by Mr. Symes.

Maintenance of the existing car fleet was reflected in the bad-order figures which jumped from 4 to 5 per cent of the total during the course of 1957. Total railroad car ownership went up by 35,000 units during the 12-months' period, reflecting the high production of cars both by builders and railroad shops.

New Books

ASTM STANDARDS ON COAL AND COKE. 140 pages. A compilation of the numerous ASTM methods of testing, definitions and specifications for coal and coke, and the standard specifications for the classification of coal according to rank and grade. Contains 21 methods of test, four specifications and three definitions. *American Society for Testing Materials, 1916 Race st., Philadelphia 3. Price, $2.50.*

Selected Motive Power and Car Statistics

• Freight Service (Data from I.C.C. M-211 and M-240)

Item No.		Month of September 1957	Month of September 1956	9 months ended with September 1957	9 months ended with September 1956
3	Road locomotive miles (000) (M-211):				
3—06	Total, Diesel-electric	35,162	36,185	330,552	332,825
3—07	Total, electric	687	713	6,243	6,548
3—04	Total, locomotive-miles	1,229	1,432	357,903	376,929
4	Car miles (000,000) (M-211):				
4—03	Loaded, total	1,574	1,715	14,506	15,114
4—06	Empty, total	942	892	8,600	8,399
6	Gross ton-miles-cars, contents and cabooses (000,000) (M-211):				
6—03	Total in Diesel-electric locomotive trains	106,541	107,590	976,323	959,676
6—04	Total in electric locomotive trains	2,180	2,311	19,773	20,317
6—06	Total in all trains	115,951	122,562	1,064,224	1,086,528
10	Averages per train-mile (excluding light trains) (M-211):				
10—01	Locomotive-miles (principal and helper)	1.02	1.03	1.02	1.03
10—02	Loaded freight car-miles	43.9	44.8	43.3	43.0
10—03	Empty freight car-miles	26.2	23.3	25.6	23.9
10—04	Total freight car-miles (excluding caboose)	70.1	68.1	69.9	66.9
10—05	Gross ton-miles (excluding locomotive and tender)	3,232	3,203	3,176	3,094
10—06	Net ton-miles	1,482	1,504	1,447	1,417
12	Net ton miles per loaded car-mile (M-211)	33.8	33.6	33.4	32.9
13	Car-mile ratios (M-211):				
13—03	Per cent loaded of total freight car-miles	62.6	65.8	62.8	64.3
14	Averages per train hour (M-211):				
14—01	Train miles	18.9	18.4	18.8	18.6
14—02	Gross ton-miles (excluding locomotive and tender)	60,026	58,236	59,026	56,869
14	Miles per diesel-electric unit day (M-240):				
14—01	Road freight units	205.3	—	209.3	—
14—02	Road passenger units	432.4	—	441.6	—
17	Car-miles per freight car day (M-240):				
17—01	Servicable	45.6	47.1	46.0	46.6
17—02	All	43.5	45.2	44.1	44.8
18	Average net ton-miles per freight car-day (M-240)	919	999	925	949
19	Per cent of home cars of total freight cars on the line (M-240)	109.9	111.8	110.7	112.0

• Passenger Service (Data from I.C.C. M-213)

3	Road motive-power miles (000):				
3—06	Diesel-electric	18,797	19,510	175,556	182,766
3—07	Electric	1,046	1,166	10,348	11,246
3—04	Total	20,113	21,317	188,689	200,874
4	Passenger-train car-miles (000):				
4—08	Total in all locomotive-propelled trains	206,323	223,176	1,939,004	2,081,180
4—11	Total in Diesel-electric locomotive trains	191,679	203,913	179,388	1,890,945
12	Total car-miles per train-mile	9.72	9.99	9.76	9.92

• Yard Service (Data from I.C.C. M-125)

1	Freight yard switching locomotive-hours:				
1—03	Diesel-electric[1]	3,639,791	3,723,101	33,977,490	33,998,545
1—06	Total	3,779,424	3,975,090	35,422,072	36,397,111
2	Passenger yard switching hours:				
2—03	Diesel-electric[1]	231,965	240,620	2,162,889	2,223,292
2—06	Total	258,083	271,153	2,414,336	2,527,538
3	Hours per yard locomotive-day:				
3—02	Diesel-electric	14.9	15.6	15.3	15.7
3—05	Serviceable	15.2	15.6	15.5	15.7
3—06	All locomotives (serviceable, unserviceable and stored)	14.0	14.4	14.3	14.3
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.67	1.61	1.69	1.67
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	0.77	0.75	0.77	0.75

1 Excludes B and trailing A units.

Personal Mention

Atlantic Coast Line.—*Waycross, Ga.:* F. A. DELANO, special engineer, appointed supervisor car maintenance.

Boston & Maine.—*Boston:* P. C. DUNN appointed assistant general mechanical superintendent. Former position of superintendent of locomotive maintenance abolished.

Canadian National.—*Moncton, N. B.:* ORA C. BISHOP, foreman, motive power shop, retired.

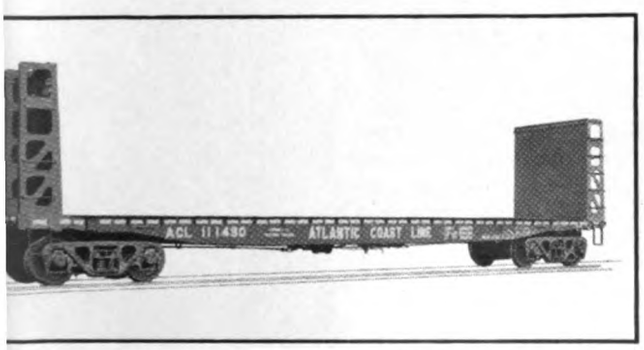
Chesapeake & Ohio.—*Russell, Ky.:* R. F. HICKS appointed general foreman, locomotive department, succeeding W. L. DEVANEY, retired.

Chicago & North Western.—*Chicago:* EARL L. WALSTON appointed to new position of general superintendent motive power and car departments. Started with Illinois Central as machinist apprentice. Subsequently became machinist, welder, loco-

(*Continued on page 63*)

Where railroad progress is cast in steel.....

800 new 70-ton pulpwood cars with Commonwealth cast steel underframes and upright ends... recently delivered to the Atlantic Coast Line by A.C.F.



Commonwealth cast steel underframe and interlocking upright ends simplify pulpwood car construction; provide greater strength, permit easier loading, maximum capacity.

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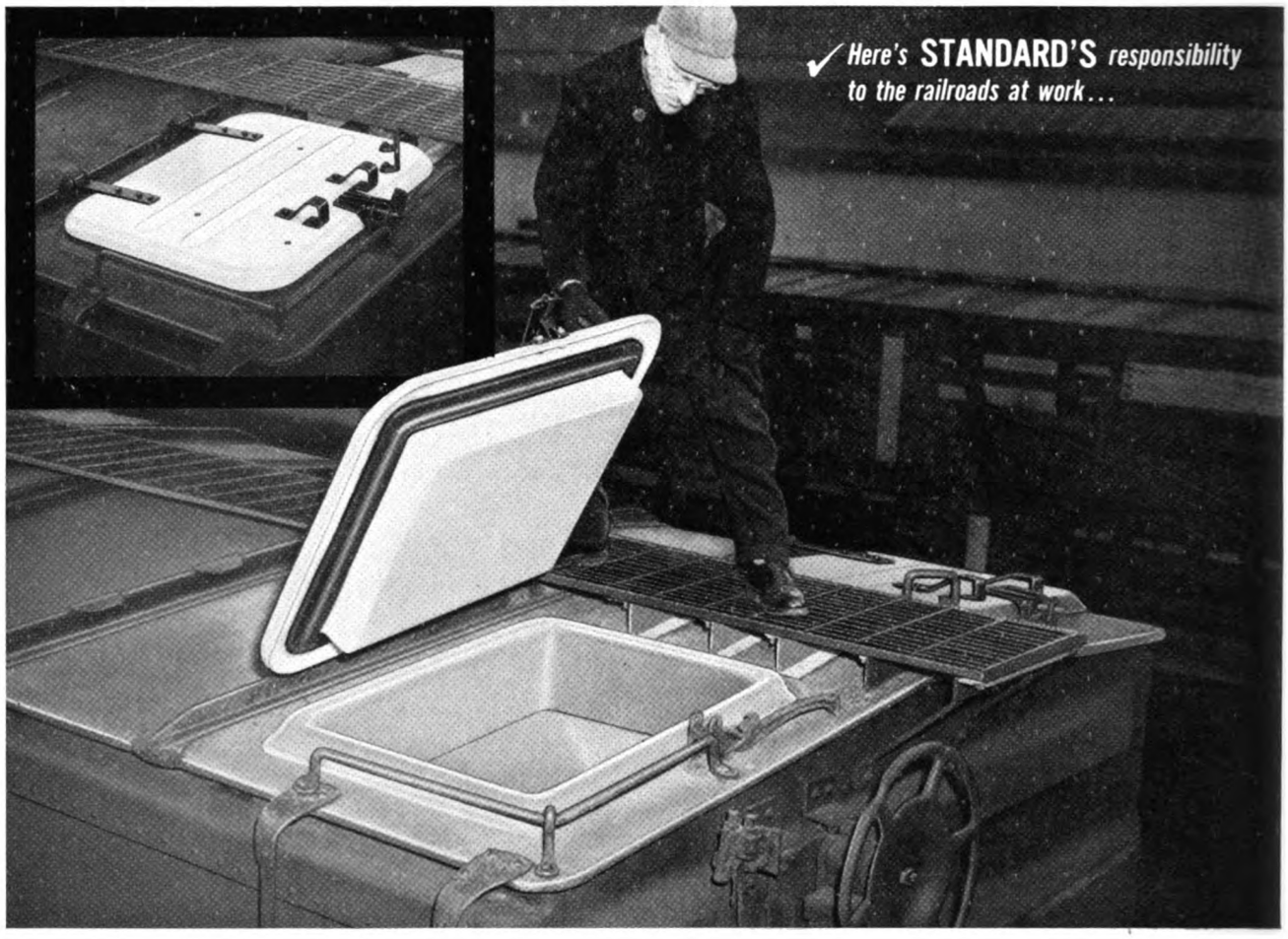
Plan wisely for the future . . . invest in Commonwealth products.

GENERAL STEEL CASTINGS



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- won't rust or corrode
- better insulation

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Made of glass reinforced polyester resin, this new hatch cover and plug design cuts weight down to 65 lbs. including hardware and gasket . . . 70 lbs. *less* than the conventional plug. There's a big plus in the new ease of handling at the icing stations, too!

The Plastic Hatch Cover and Plug is suitable for either Standard's welded design or new integral design Hatch Frame and will not rust or corrode. Salt and brine have no effect. And the Plastic Plug's core of insulation gives greater resistance to heat transfer. Your own choice of hardware can be used.

Ask your Standard representative for information on how the new Plastic Hatch Cover and Plug can go to work for you.

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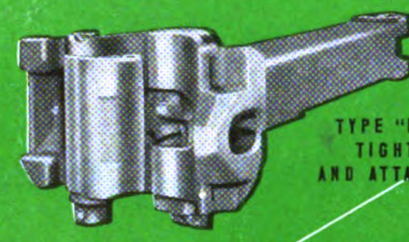

TYPE "H" TIGHTLOCK COUPLER AND ATTACHMENTS

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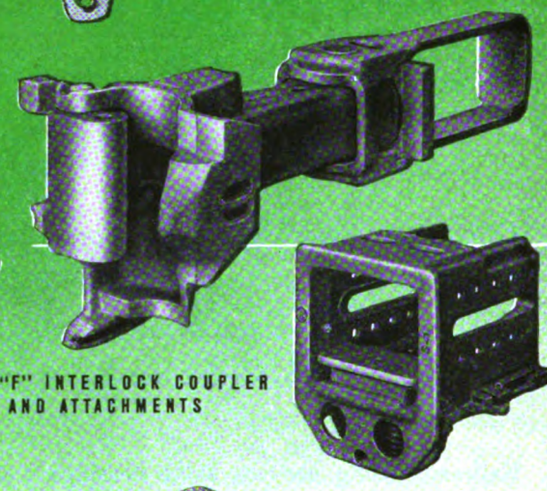
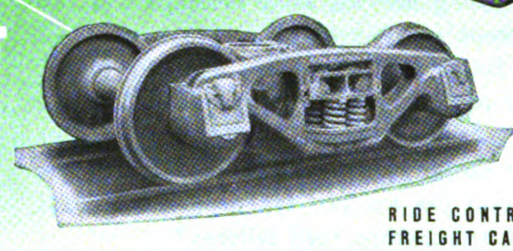
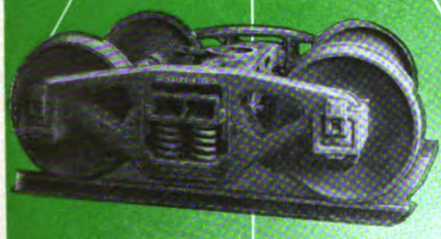


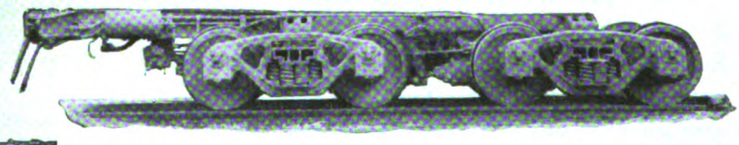
TYPE "F" INTERLOCK COUPLER AND ATTACHMENTS



RIDE CONTROL (A-3) FREIGHT CAR TRUCK



BUCKEYE C-R (CUSHION-RIDE) FREIGHT CAR TRUCK



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It's a fact...

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Operating experience with more than 5,000 freight cars proves that Solid Bearings and Journal Stops are the low-cost solution to the hot-box problem

Railroads using low-cost solid bearings and R-S Journal Stops today average over 6,000,000 car miles per hot box. Conservatively, new users of R-S Journal Stops can increase hot box mileage 10 times — can cut hot box costs to a tenth of current costs on similar cars in similar service. That means less than ⅓ cent per car per day to cover all costs associated with bearing road failures.*

That's just one of the facts about R-S Journal Stops, proved now on over 5000 cars in service. Essentially, they stabilize the bearing assembly, help provide uniform, uninterrupted oil film lubrication, give the solid bearing a chance to work at optimum efficiency.

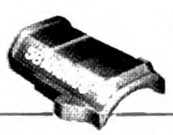
Results: you double bearing life, reduce wheel flange wear, cut necessary service attention, prevent dust guard damage — in short, save on truck maintenance all along the line. This reduced maintenance alone will save you enough to pay for the Stops in 3 years.

And with R-S Journal Stops, you still have all the other advantages which low-cost solid bearings bring to railroad rolling stock. You can take the maximum load, make the fastest schedule. Lading gets the smoothest ride. You save excess dead weight and get lowest possible running resistance in pounds per ton. Best of all, you'll be sure of the kind of bearing performance you want at a price you can afford to pay. Write us for all the facts. Magnus Metal Corporation, 111 Broadway, New York 6, New York; or 80 E. Jackson Blvd., Chicago 4, Illinois.

**Cost based on data compiled by the Mechanical Division of the Association of American Railroads in 1955.*

MAGNUS

Solid Bearings



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How Stabilized Employment Saves Money at Lehigh Valley's Sayre Shops

As the first major eastern road to replace steam operation with diesels, the Lehigh Valley also became the first to face the problem of improving shop efficiency to keep pace with diesel economies. Because the requirements of diesel maintenance differ so radically from those of steam, shop operations had to be drastically altered, both in kind and in quantity. The skills required changed—electricians are obviously more necessary to diesel-electric maintenance than boilermakers—and the work required far fewer men.

In 1946, the Lehigh Valley operated 322 steam locomotives and 59 diesel units. Today the road handles its traffic with only 223 diesel units, made up into 189 locomotives.

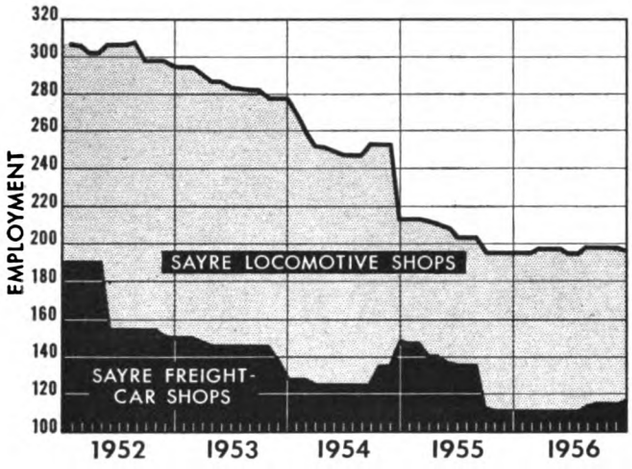
With 158 fewer locomotive units to be maintained now than 10 years ago, the LV locomotive forces are necessarily much smaller than in the heyday of steam. Mechanized equipment, like the automatic wheel-truing machine, is used wherever possible to increase efficiency. Efficiency of the shop men has increased too. The present force has fewer helpers and more mechanics and apprentices in the highly skilled crafts.

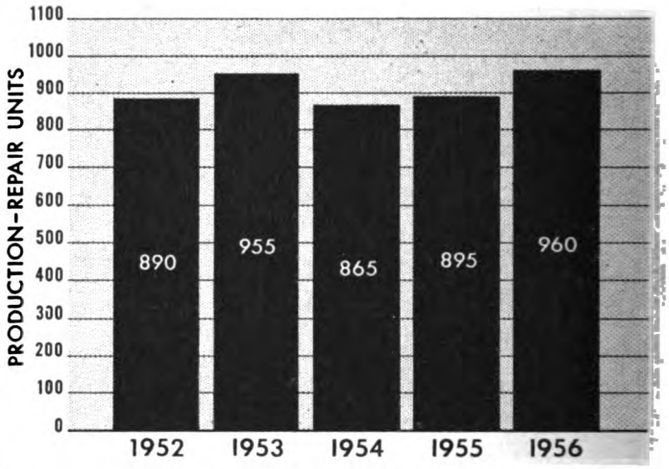
As the chart of shop employment at Sayre shows, there has been a steady down trend, but there has also been good stability at various levels, and the work force has tended to level off since mid-1955. The pattern shown on the chart is practical stabilization of employment, the LV and its mechanical department men feel. This kind of stabilization does not freeze employment at any given level; that would be both short-sighted and foolish with continually rising costs demanding ever-increasing efficiency for the railroad even to hold its own. This kind of stabilization does permit advance planning for using the whole work force efficiently and steadily from year to year.

How the Shift Was Made

As the shops have become more mechanized, shop-force jobs have been upgraded. The number of men employed in Sayre shops has decreased by 30 per cent since 1952, but the payroll has been cut by only 13 per cent in the same time. In making the transition from diesel to steam, a good many of the men whose crafts were no longer needed in quantity in the locomotive shop went into the car shop. A good many boilermakers, for example, qualified in carbuilding crafts and continued on the rolls, though with greatly

APPRENTICE TRAINING is essential part of stabilized employment program. D. T. Little, apprentice instructor, heads classroom work.





Figures for production are based on a total obtained by adding heavy and light car repairs and light locomotive repairs to a weighted figure for heavy locomotive repairs.

reduced seniority. Older men were urged to, and did, retire at 65 rather than wait to take their pension later. Men in crafts in demand who retired or died or left the payroll for some other reason were not replaced immediately, or were replaced by men from one of the steam crafts.

An apprentice training program provides enough trained men to take care of vacancies that have to be filled. The Lehigh Valley program was organized with the approval of the shopcraft brotherhoods and the Federal Apprentice Training Bureau of the Labor Department. The railroad makes every attempt to plan the program to graduate the right number of technically trained apprentices each year in the machinist, electrician and other crafts to fill jobs that come open that year. Under the system in force in the steam shops, new men qualified as helpers first. After a vacancy came up, they could be set up as machinists or in some other higher-rated classification. This system tended to keep the age level of the most skilled crafts rather high and meant that the railroad was not getting the full benefit of younger men with the most recent training. The present apprentice system qualifies men for the higher-rated crafts without requiring them to serve a period in one of the lower-rated crafts. Eventually, the apprentice program will produce in the shop force a balance between men with experience and young men trained in the most modern techniques.

At the present time, some 40 apprentices are undergoing training at Sayre. The men in the program are mostly high-school graduates, and most of them have been accepted because they show potential talents as future supervisors. In addition to regularly scheduled class work in the apprentice classroom at Sayre, apprentices must

LV M of E Ratio
Compared with Eastern and National Averages

Year	LV	Eastern railroads	All Class I railroads
1956	16.8	18.1	18.0
1955	17.2	18.1	17.7
1954	17.1	19.1	18.3
1953	17.7	19.6	18.6
1952	16.3	19.7	18.5

LV M of E Budget
Compared with Actual Expenditures

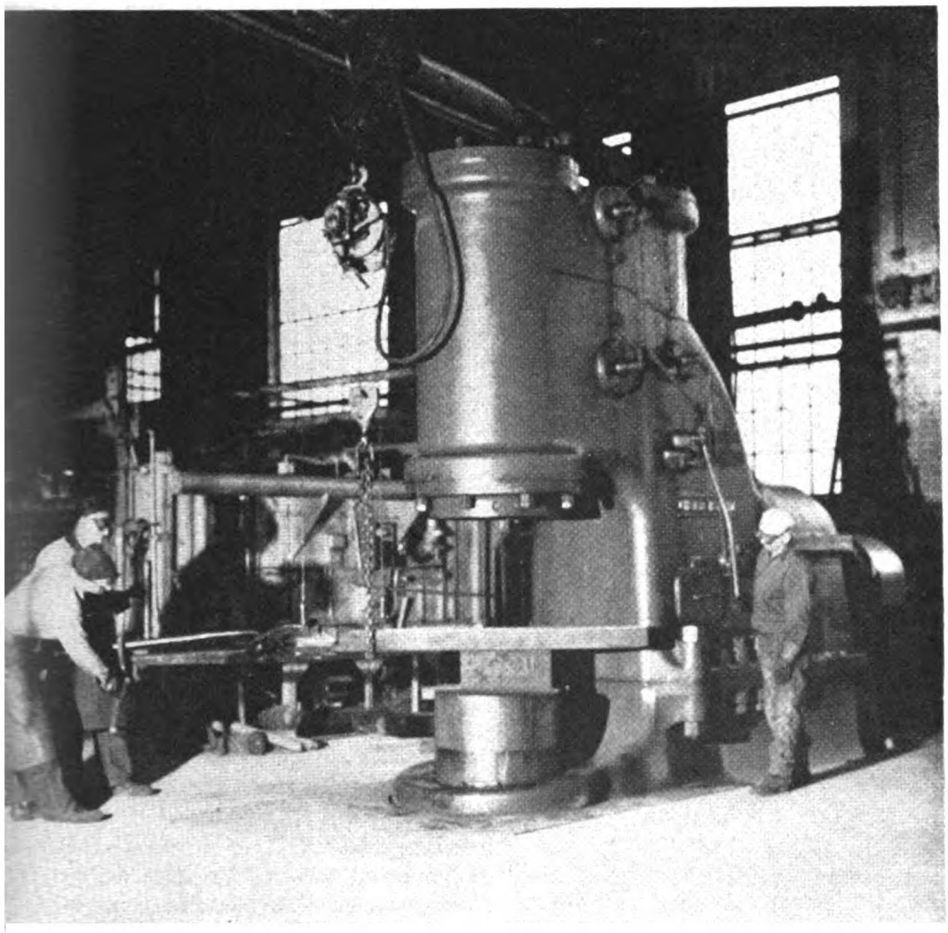
Year	Planned budget	Actual expenditures	Per Cent variation from plan
1956	$11,689,700	$12,050,821	+ 3.1
1955	12,282,500	11,851,078	− 3.5
1954	12,754,120	11,193,709	−12.2
1953	13,569,500	13,502,656	− 0.49
1952	12,742,400	12,806,459	+ 0.50

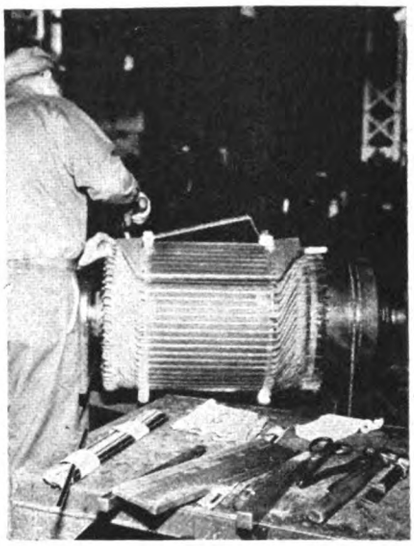
Comparison of Overhead (Shop Expense) with Labor Expense
Sayre Locomotive and Freight Car Shops

	Locomotive Shop		% Overhead to	Freight Car Shop		% Overhead to
Year	Labor	Overhead	labor	Labor	Overhead	labor
1956	$564,495	$323,053	57	$420,897	$118,665	28
1955	556,083	297,564	54	453,062	132,743	29
1954	543,117	288,015	53	413,694	141,070	34
1953	662,447	338,522	52	497,336	225,529	46
1952	706,909	332,219	47	582,051	232,379	40

Lehigh Valley M of E Overtime
Compared with Total Wages

Year	Total M of E Wages	Total M of E Overtime	% Overtime to Total Wages
1956	$6,686,848	$161,156	2.4
1955	6,568,610	156,131	2.4
1954	6,508,845	131,699	2.0
1953	7,125,955	202,242	2.8
1952	7,256,710	207,536	2.9





REWINDING ARMATURES on traction motors is sometimes done by Sayre shop electrical force, sometimes by builder. Electrical shop handles normal program; peak loads are returned to factory.

MARINE REPAIRS for Lehigh Valley tugboat fleet are handled in Sayre. A 3,000-lb pneumatic forging hammer is straightening a marine toggle pin.

take—and pass—a lengthy correspondence course from the Railway Educational Bureau. W. E. Lehr, superintendent of motive power, keeps track of the apprentice program personally. If a man lets himself fall behind, in either the Sayre classes, or the correspondence course, he is asked by Mr. Lehr to account for his difficulty. If the explanation is not satisfactory, the offender is cautioned by an apprentice committee, made up of management and labor organization representatives. If there is still no improvement, his case is further considered and he is likely to be dropped from the program.

Programmed Maintenance

The backbone of stabilized employment in any mechanical department is programmed maintenance. On the Lehigh Valley, a schedule is established for all equipment to determine when its most economical renewal date will come. The railroad looks at the matter as a straight accounting proposition. Any given piece of equipment starts out with a balance of a certain number of miles of trouble-free operations; say for example, a locomotive has a mileage expectancy of 300,000 miles without needing major repairs. If you have 200 locomotives with this same mileage expectancy, the railroad has a total mileage expectancy of 60,000,000 miles without major repairs. Every train mile operated lowers this balance, and if all 200 of the locomotives were allowed to run off 300,000 miles each without having their mileage balance restored, the railroad might suddenly find itself unable to operate because all of its locomotives could be expected to fail at the same time. Programming locomotive and car maintenance puts the mileage balance back. By means of programming, mechanical officers can schedule repairs in advance of a major breakdown insuring equipment will be on hand to meet the needs of the traffic department.

A good program doesn't permit either cars or locomotives to keep running until they wind up on the dead track for emergency heavy repairs. Instead, it performs the necessary repair operations before the emergency occurs. A program of this sort also means that the motive power and equipment superintendent can budget the amount of men and materials he will need for a year, because he can forecast in advance with accuracy just how much work he will have to do during the year.

Budget—Planned and Actual

The traffic department and the executive officers of a railroad can plan with fair accuracy what their revenues will be for any given five-year period. In these estimates, they may make mistakes, but if they do, they will be in good company, since every other major industry in the United States will be forecasting its business expectations, most of them using the same data the railroads use. A one-year budget based on anticipated revenue can be drawn up with con-

siderable accuracy, barring emergencies. With the revenue figure on the one hand, and the requests of the various departments for money to carry out their programs on the other, the executive officers of the road can plan what percentage should go to maintenance of way, what to maintenance of equipment, what to operating, etc.

Individual departments will not always get what they ask for in their budget but budget cuts will be made well in advance of any actual commitment of men and materials to any given project. There will not be the enormous waste involved in shutting down a major facility for two or three months because monthly revenues are down, and then, when the facility is reopened, running it overtime trying to catch up with work that has necessarily been deferred.

Once a department budget is submitted to the executive officers, it is adjusted to the expected revenue, and also to fit the needs of the other departments. When the mechanical budget comes back to the superintendent of motive power it is still subject to review during the forthcoming year to adjust it to altered conditions, but it does give a reasonably accurate guide as to how much money will be available for maintenance during each month of the following year. This, the superintendent of motive power uses to plan his detailed schedule for accomplishing the production goals that have been set by his maintenance program.

Stabilizing Manpower

On the Lehigh Valley, variations in money available from month to month show up mostly in the money used for materials and stores; the manpower budget remains relatively constant. LV feels that it has an investment in its employees, just as it has in its labor-saving machines. The railroad invests about $12,000 in putting a man through the apprentice course, and it considers it just as important for this money to earn a fair return as for any other investment.

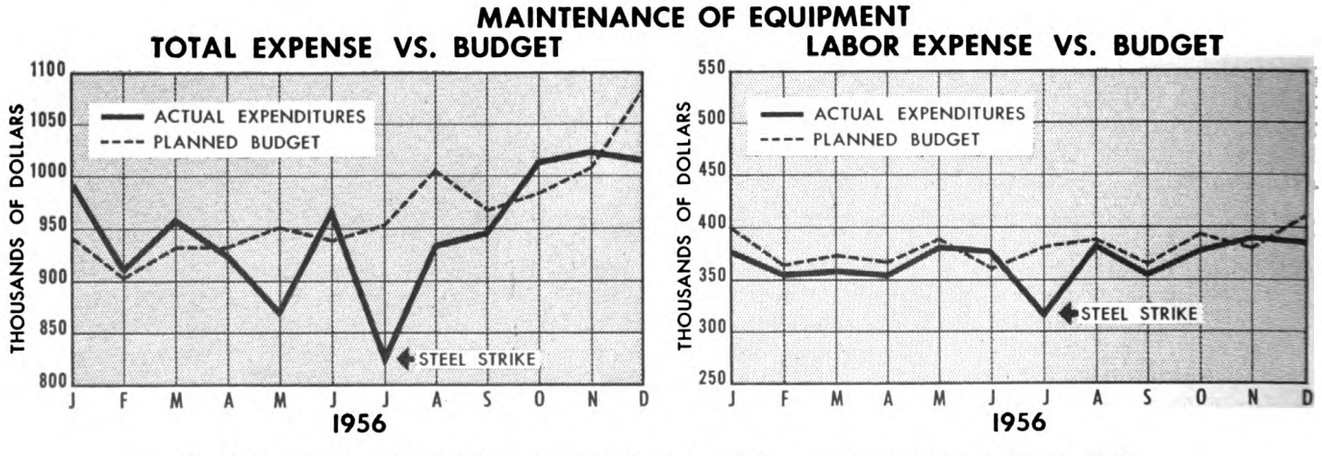
Stabilized employment on the Lehigh Valley has been accomplished through a smaller work force working steadily and efficiently throughout the year. It has not tended to freeze jobs at an artificial level, but it has created an atmosphere of job security that helps the railroad get and keep good men. The railroad likes it, and so do the employees.

Stabilized employment is possible largely because mechanical department work is programmed well in advance of the time the work is performed and because the mechanical department is operated on an annual budget rather than one tied to fluctuations in monthly revenue. This does not mean that the mechanical department spends more money in the course of the year than it would under a monthly budget; it does mean that the money can be spent wisely and more efficiently.

Monthly fluctuations in the work load are handled by setting the size of the work force at a figure large enough to handle normal requirements. Programmed maintenance means that there are few periods of less work than scheduled. When these occur, the shop is not shut down; instead, work is done in the shop—such as rewinding armatures or rebuilding engines—that might ordinarily go back to the manufacturer.

Moral of the Story

A stabilized mechanical department, like the increased automation that goes along with it, is an established part of the Lehigh Valley's program for increasing railroad efficiency to keep up with increased railroad costs. The principle of stabilized employment is not new; it has been accepted by progressive mechanical men for years. The files of Railway Mechanical Engineer (as Railway Locomotives and Cars was then called) for the 1920's are full of references to stabilized mechanical employment, but the financial difficulties of the railroads during the years following did not permit the principle of mechanical stabilization to become established. At this point in our financial history, with automation and increased efficiency hailed in most industries as the key to survival, the financial difficulties of the railroads raise a different question: Can mechanical departments keep their efficiency up and their costs down *without* mechanical stabilization?



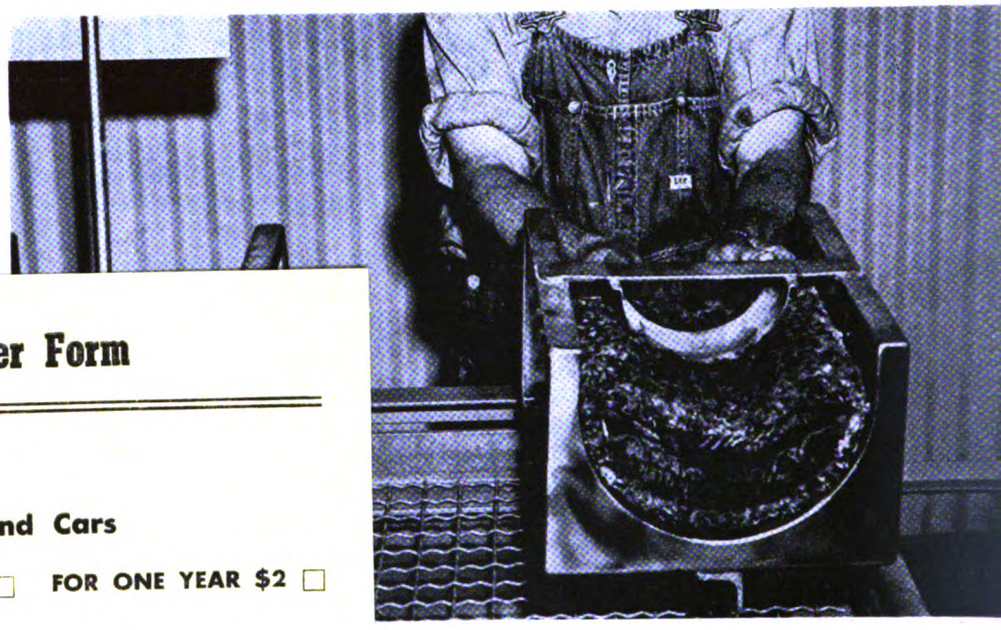
Comparison of Actual M of E Labor and Total Expenses with Planned Budget, Month by Month, 1956.

and it is anticipated that the two plants will be adequate when all N&W cars have lubricators. It is predicted, however, that it will be necessary to operate more than one shift per day at that time.

Two men must operate the plant to sustain maximum output. A complete three-step cleaning cycle for one load of 13 pads takes approximately ten minutes and is broken down as follows:

- Unloading pads with a barrel dump and loading the cleaning machine requires two minutes. Pads are dumped on a preliminary inspection and sorting table where excess oil drains away and where pads can be handled during the loading.
- The cleaning machine cycle requires six minutes. During this time the pads are first agitated through the cleaning oil and finally are spun to remove all oil.
- Unloading the cleaning machine; trimming loosened strands from the pads; gauging and inspecting them; and loading them in drums for return to line points requires two minutes. Pads are returned to the line points dry and

Reclamation of pads are readied for return to service. All types installed by N&W can be reclaimed.



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proper saturation with good car oil at right temperature.

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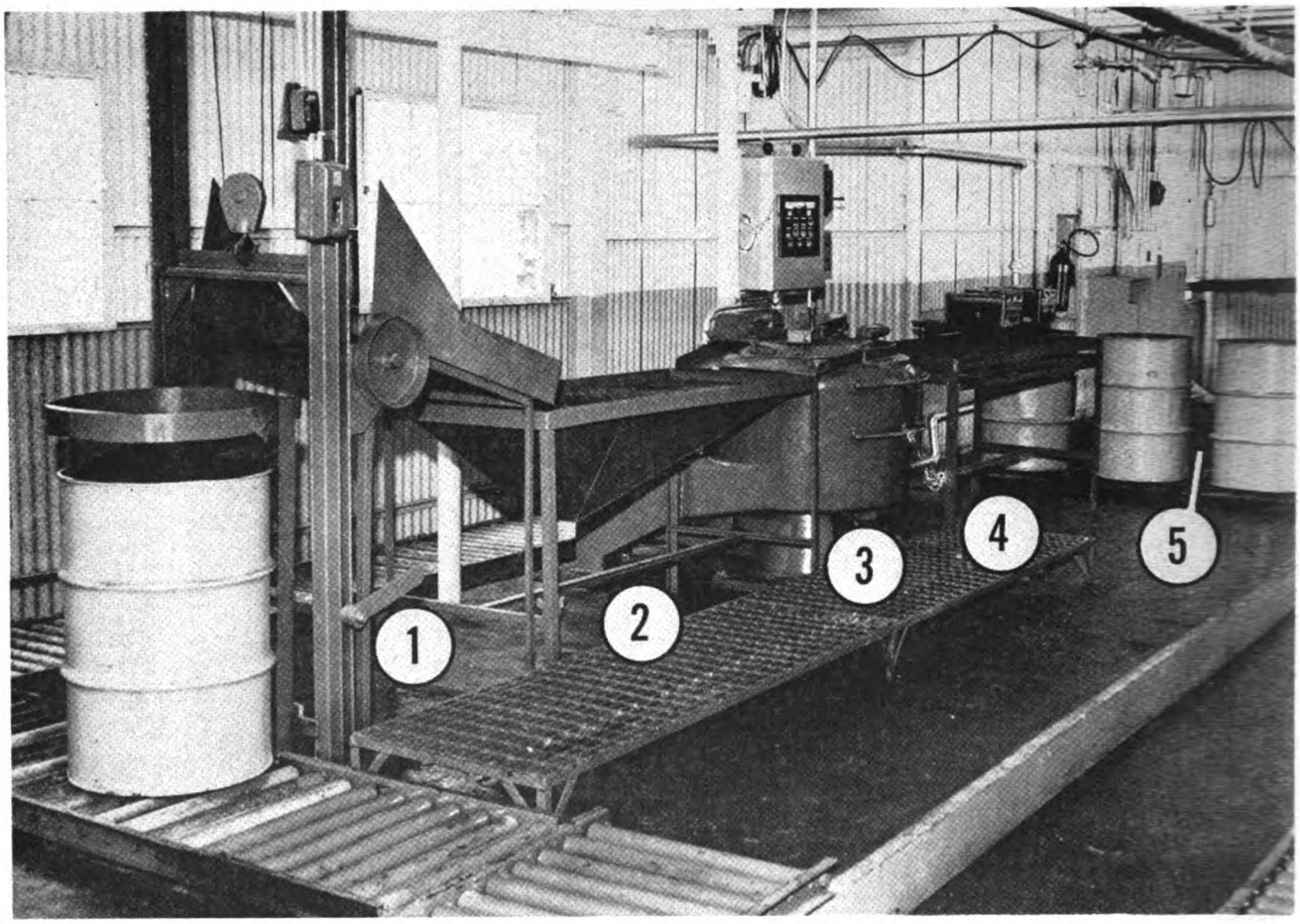
ing process are not developed sufficiently to report results, and the same situation exists with respect to cleaning costs. The N&W has reclaimed its own waste packing for the past forty years. From work done to date, there is every indication that pad reclamation will be done exclusively by the N&W too.



Components of pad reclamation plant at Portsmouth, Ohio, include: (1) electrically-operated barrel dump to unload incoming drums of pads; (2) inspection and sorting table prior to loading into cleaning; (3) cleaning machine is combination agitator, washer and centrifuge, (4) final inspection table where pads are gauged for height and placed in drums for shipment; (5) underground reservoir and filtration system.

How N&W Reclaims Its Lubricators

The N&W has been a pace setter in installing journal lubricating devices to replace loose waste. Recently the road has been pioneering development of equipment for reclamation of these devices.

Currently there are 10 types of lubricators in service on the N&W. Among these, only one type has not been in service long enough to require reclamation. All of the others have been successfully reclaimed and the N&W anticipates no difficulty with the thirteenth type when it is due for cleaning.

The road now has two pad reclamation plants in operation. One is at Portsmouth, Ohio, and the other is at Shaffers Crossing shop at Roanoke, Va. Each of the pad reclamation plants has the same equipment. The Portsmouth installation is located in the N&W's only waste reclamation plant.

Washing is done in a machine which is a combination agitator washer and centrifuge. The cleaning solution is standard AAR specification car journal oil. It is used at a temperature between 220 and 240-deg F which range is used for cleaning all types of lubricators.

Actually the cleaning machines are owned by the Railway Service and Supply Corp. of Indianapolis. The N&W leases this equipment. Work done to date has been a joint experimental effort on the part of the railroad and the leasing concern to develop methods and modifications which will do the best pad cleaning job.

Much of the preliminary reclamation work was done on pads removed from cars caught in floods in Kentucky and West Virginia last spring. At that time, various methods for reclamation were tried, including the use of the N&W's existing waste reclamation plant. This work provided much of the ground work for the present equipment and processes. Because all methods of pad reclamation were experimental, the N&W made its decision to lease the cleaning machines it now operates.

Capacity of each of the reclamation plants is 78 car sets (624 lubricators) each 8-hr shift. At the present time there is not enough reclamation work to permit capacity operation for any sustained period. The two plants handle all the present reclamation requirements on an abbreviated schedule,

and it is anticipated that the two plants will be adequate when all N&W cars have lubricators. It is predicted, however, that it will be necessary to operate more than one shift per day at that time.

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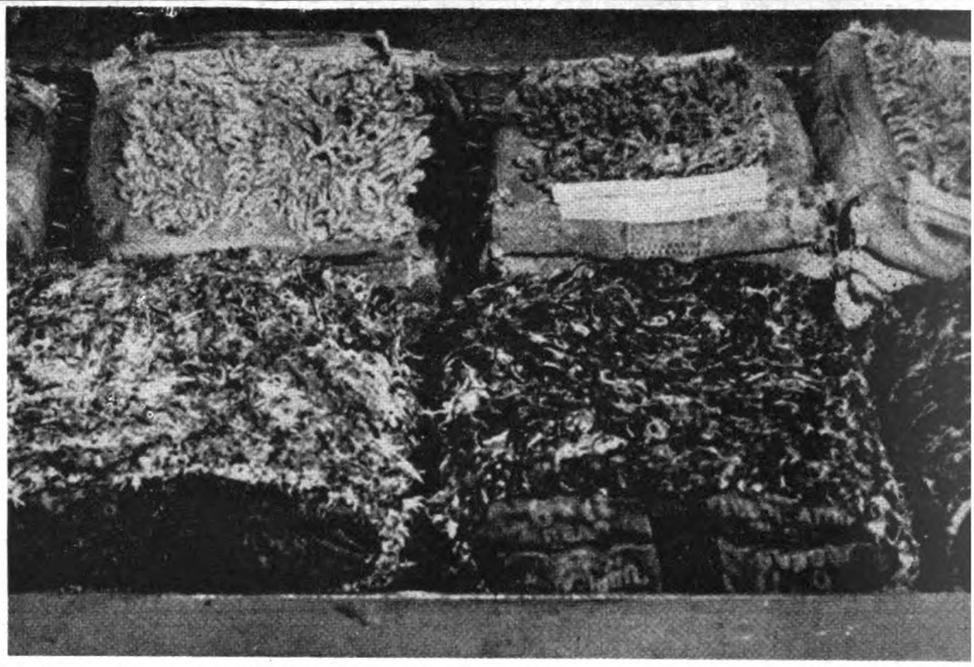
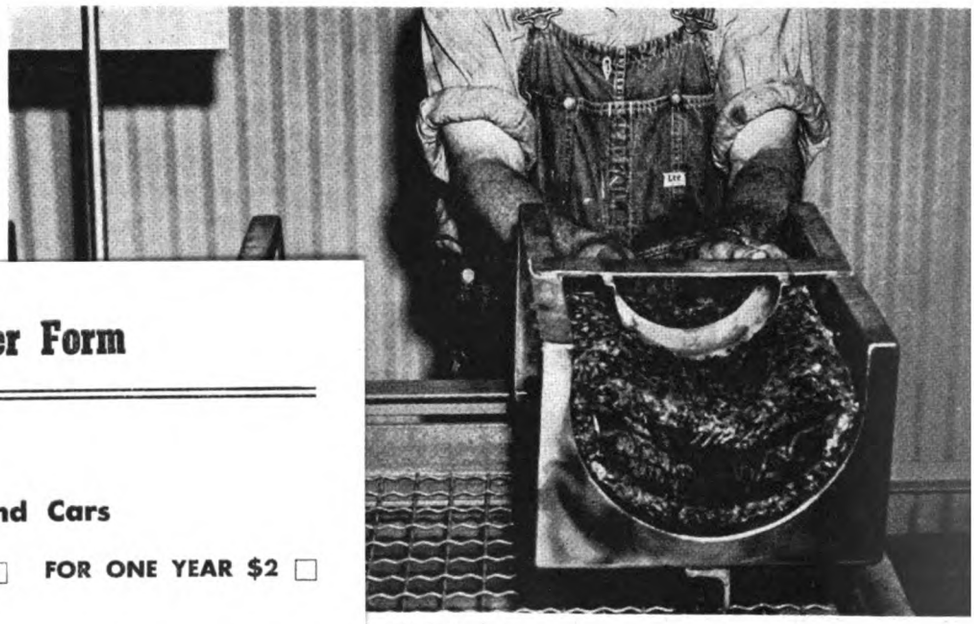


Reclamation of pads are readied for return to service. All types installed by N&W can be reclaimed.



of N&W's reclamation. Gauges are those specified by -910A-57, "Renovated Journal Lubricating Devices."

proper saturation with good car oil at right temperature.

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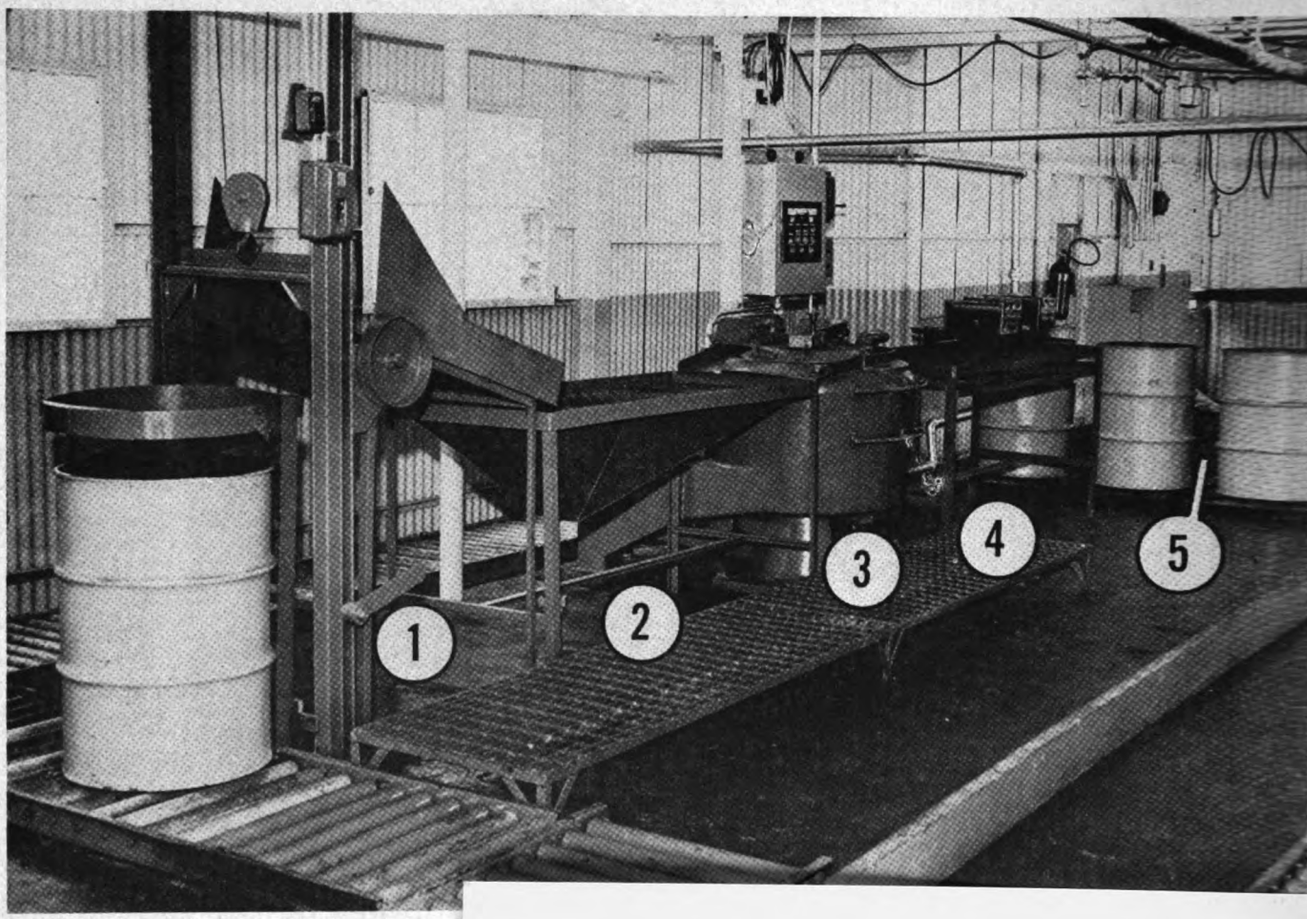

Components of pad reclamation plant at Portsm
(1) electrically-operated barrel dump to unload inc
(2) inspection and sorting table prior to loading

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EMMETT STREET

BRISTOL, CONN.

How N&W Reclai

The N&W has been a pace setter in installing journal lubricating devices to replace loose waste. Recently the road has been pioneering development of equipment for reclamation of these devices.

Currently there are 10 types of lubricators in service on the N&W. Among these, only one type has not been in service long enough to require reclamation. All of the others have been successfully reclaimed and the N&W anticipates no difficulty with the thirteenth type when it is due for cleaning.

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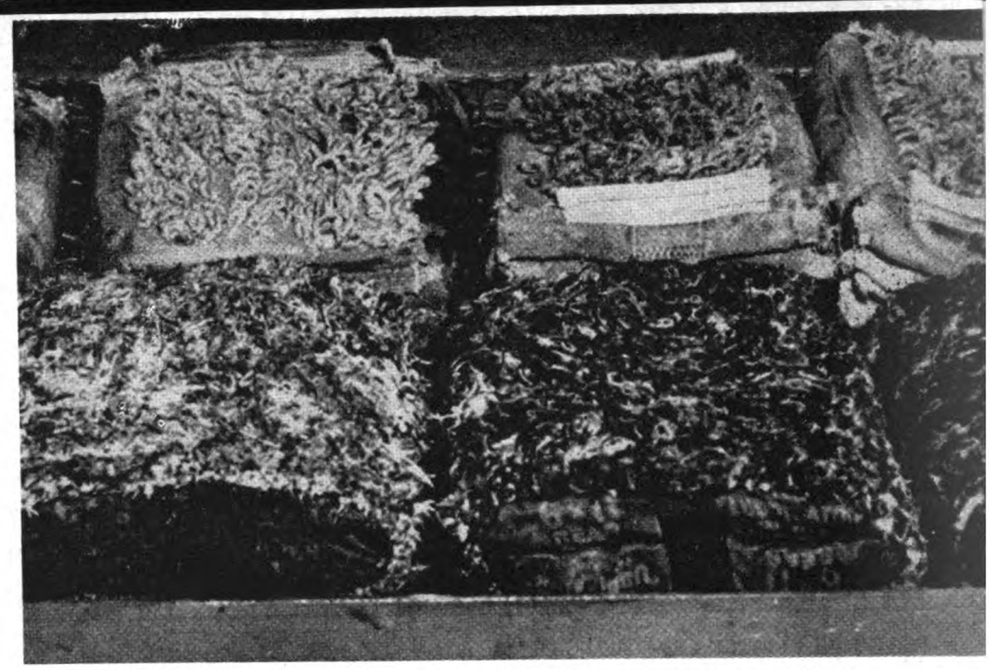
- Unloading the cleaning machine; trimming loosened strands from the pads; gauging and inspecting them; and loading them in drums for return to line points requires two minutes. Pads are returned to the line points dry and are saturated with oil before again being installed in cars.

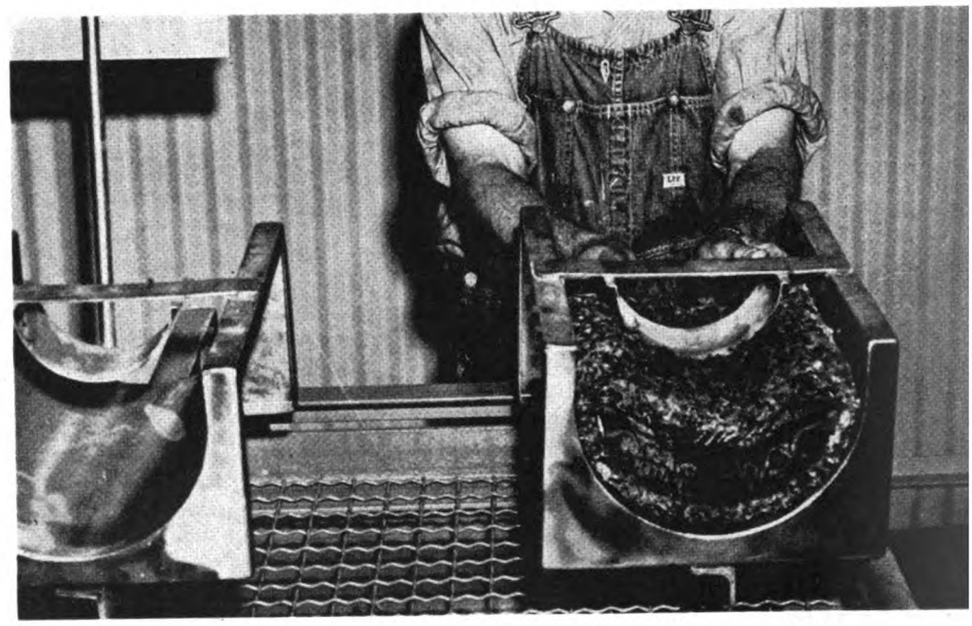
Practically all the pads are put through this cleaning process before any are scrapped. This recovers the oil they contain. There is a minimum of preliminary inspection, and only the very badly damaged pads are scrapped before reclamation.

All types of pads are reclaimed in the same way. Some types are damaged during cleaning. In a few instances the N&W has recommended changes to manufacturers to correct weaknesses which became apparent when their lubricators were reclaimed.

As yet, no satisfactory method has been developed by the N&W to repair torn pad covers, but some experiments have been conducted to determine possible solutions. Tests on the efficiency of the cleaning process are not developed sufficiently to report results, and the same situation exists with respect to cleaning costs. The N&W has reclaimed its own waste packing for the past forty years. From work done to date, there is every indication that pad reclamation will be done exclusively by the N&W too.

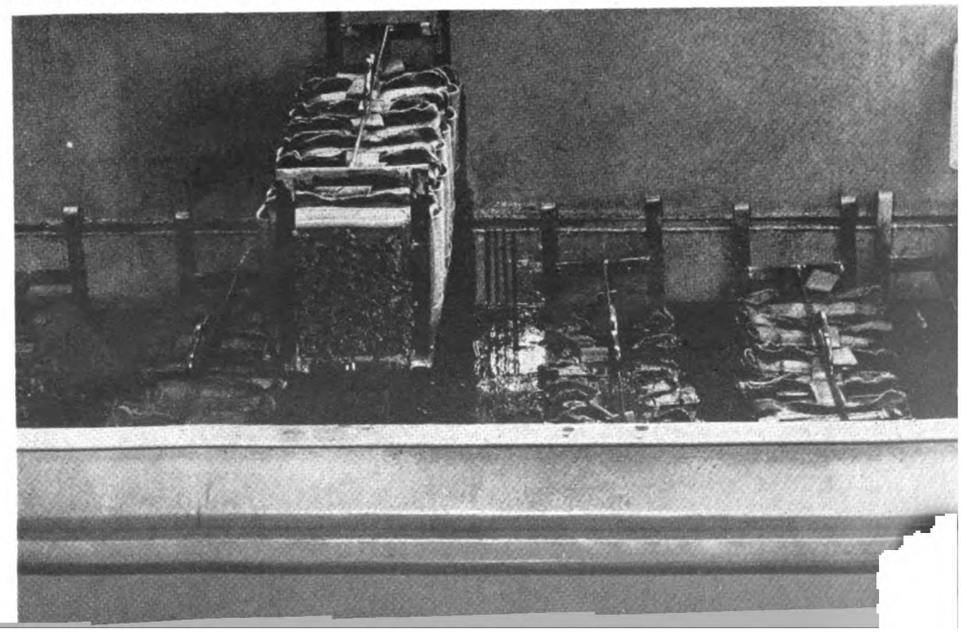


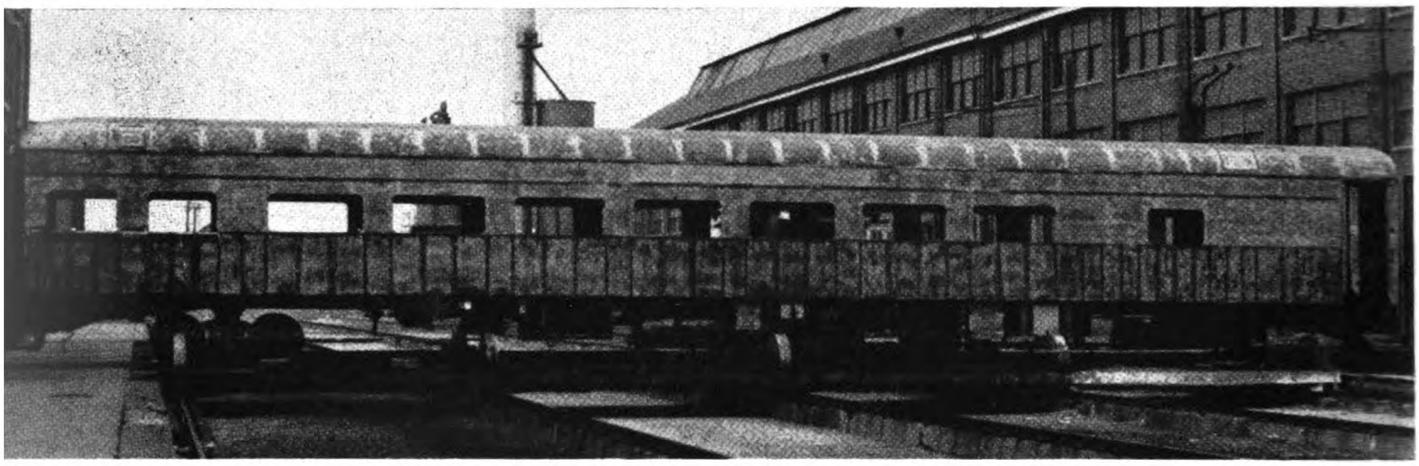
Reclamation of pads are readied for return to service. All types installed by N&W can be reclaimed.



Heignt check of pads is part of last stage of N&W's reclamation. Gauges are those specified by recently adopted AAR Specification M-910A-57, "Renovated Journal Lubricating Devices."

For good results pads must have complete, proper saturation with good car oil at right temperature.





WHAT THEY DO Stripped down inside and out, coach moves into shop for welding operations.

Face-Lifting by Heliarc Welding

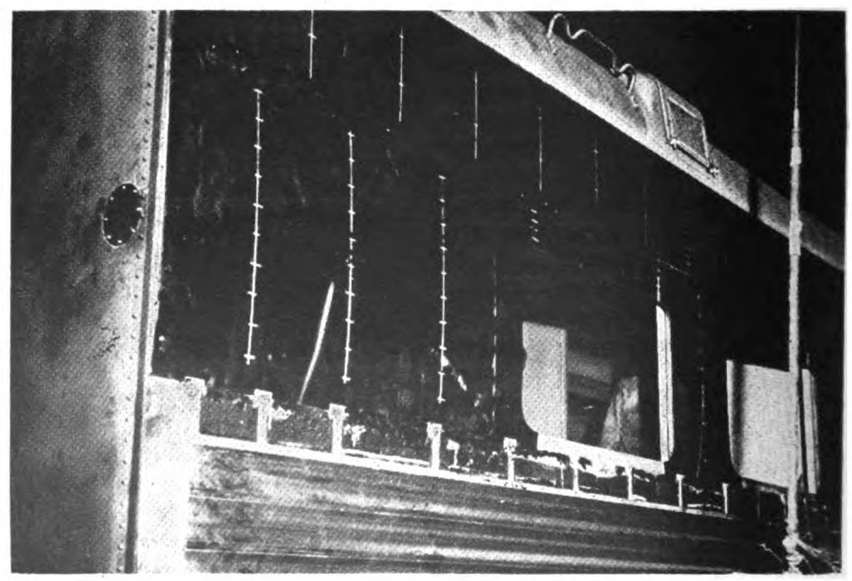
Lower maintenance costs and improved appearance feature siding repairs made to eleven passenger cars at the C&EI shops in Danville, Ill. The cars are eleven years old, and from the start had fluted stainless steel siding below the window sills. Above the sill line the sheathing originally was steel plate which required frequent painting. This painted area is now sheathed with 20-gage, 18-8 stainless steel. Cars repaired included eight coaches, two diners and one lunch-counter car.

After sand blasting, a special mixture of aluminum paint primer is applied before welding the stainless steel to the original sheathing. To anchor the new sheathing, the Heliarc spot welding automatic time cycle was set for three seconds. A ⅛-in. electrode and 130 amp ac welding current, with superimposed high frequency was used. This method — according to C&EI officials—is fast; produces clean welds; and only minimum weld finishing is required. Although welding can be done from only one side repairs were not difficult. Each section is marked to indicate to operator the proper location of welds.

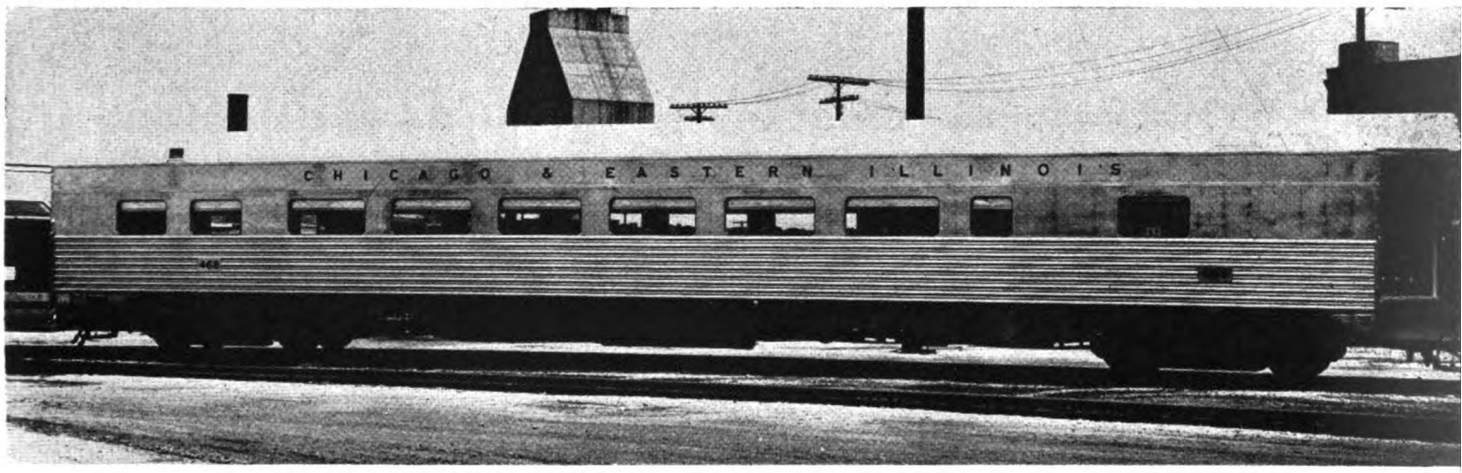
In making edge welds around each stainless steel window frame, heliarc fusion welding process is used. Before welding, the frame and side metal is clamped together. Using 110 amp, ACHF with argon gas shielding, the welding produced clean rounded weld beads where the frame is joined to the older side sheet. Approximately fifteen eight-hour days of fusion and spot welding is required on each car. Most of the welding is done by one operator.

The fluting was removed from the coaches and lunch-counter car and surfaces were sand blasted. Some corrosion was found which required patching, and the small support channels were rewelded. This surface is sprayed with 3M body undercoating EC-1412, about $\frac{3}{32}$ in. thick for a preservative and to control noise. Fluting was reapplied with Cherry monel blind rivets. The fluting was partially removed below the window sills on the two diners for surface inspection, and to permit lapping the stainless steel upper sheathing. The lunch-counter car, originally all painted, was sand blasted, and new fluting and stainless steel siding applied.

Four coaches, previously observation cars, had their rounded ends



HOW THEY DO IT Location marks on new stainless side sheathing show points where Heliarc spot weld is made.



Completely modernized, with extensive use of stainless steel, this C&EI coach is now ready for service.

squared off, and Mars lights removed. Skirts were removed from coaches and lunch-counter car, but left on the diners. Platforms, trap doors and folding steps are rebuilt of stainless steel, and end doors and vestibule doors were replaced with Met-L-Wood stainless sheathed units. Pittsburgh sash was set in rubber seals in windows. Lifting lugs were applied to all cars.

All trucks were completely overhauled, and redesigned long-travel springs applied along with Houdaille snubbers. The Frigidaire air conditioning and all motors were overhauled. Zone heating was removed from four coaches and Vapor's newer Unizone applied. This was done to simplify the heating system. It is now necessary to maintain only one regulator instead of three. No change was made in the air brake system. The roofs of all cars were painted with Dulux exterior aluminum paint, and clear varnish was then applied. Heliarc welding has been used experimentally on roof sections to eliminate leaks.

Interior Materials

End panels, bulkhead partitions and panels between the windows in some coaches are covered with Styl-O-Vin impregnated wall fabric in various designs. Some murals and mirrors were removed for this application. Stainless steel wainscoting is now used above the pipe shields, and Resistal #302 embossed stainless wainscoting is used in passageways and in some toilets. The seats were re-upholstered over the original sponge rubber. Carpets were removed from diners, and replaced with Terraflex vinyl asbestos tiling in 9-in squares. Walls and ceilings are covered with vinyl fabric.

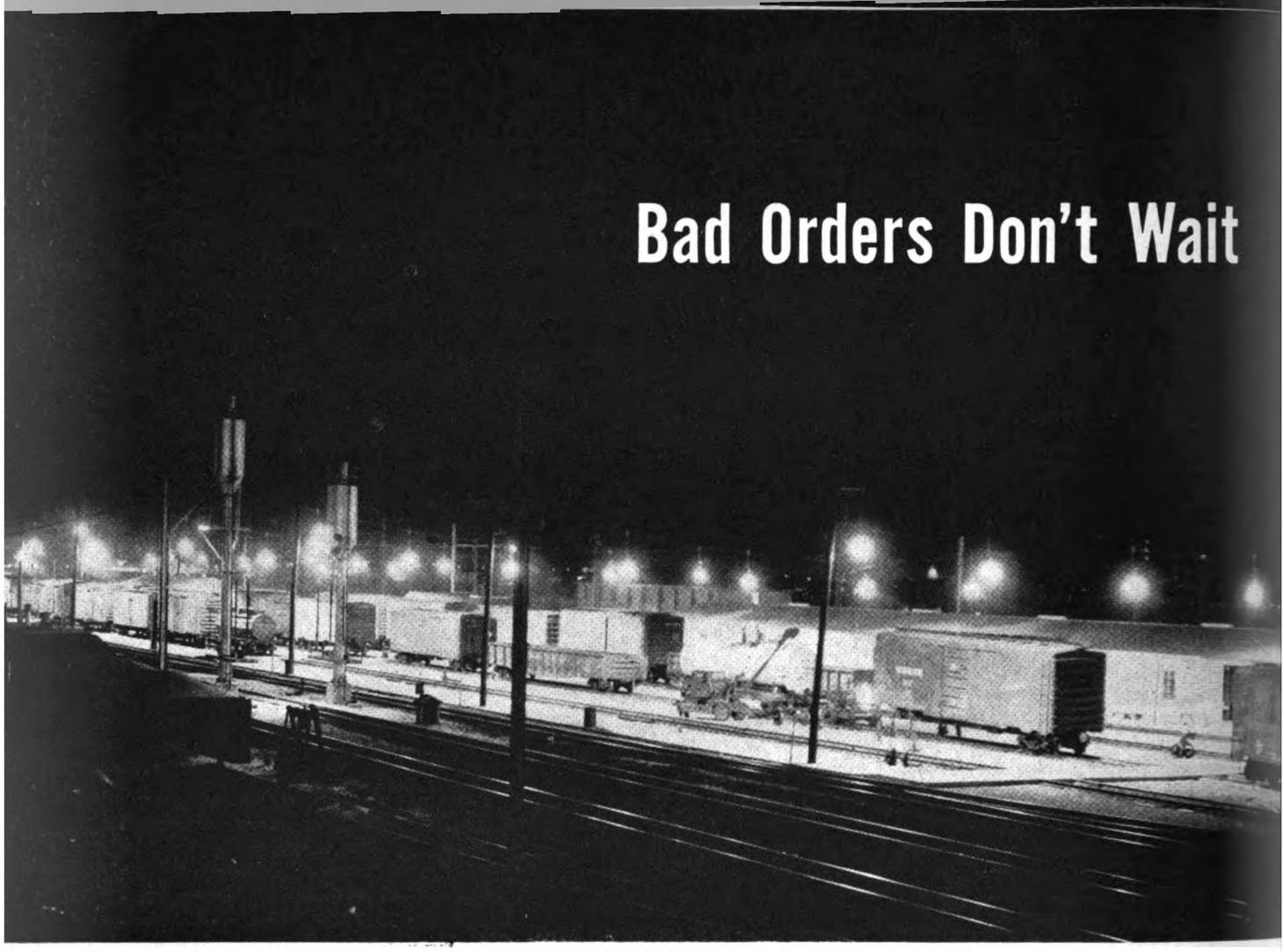
Candy, coffee-and-hot-chocolate, cigarettes, and refrigerated-sandwich-and-milk vending machines were placed in two of the coaches on an experimental basis. Power for the sandwich machine is provided by an alternator installed under car.

C&EI officials say the cost of complete rebuilding operation is about 12 per cent of the cost of a new car.

Clamps hold stainless window frame for 100% heliarc fusion weld to older side sheets.

Spot welding stainless understrip to sheathing is a fast and simple operation.

Bad Orders Don't Wait

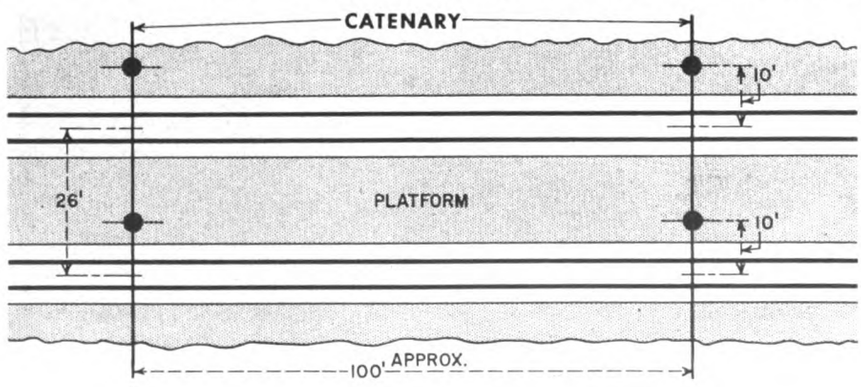


Night lighting in repair area permits full-time operation although RF&P finds that two-shift operation meets the pace demanded by connecting roads.

Potomac Yard's New Facilities and Operating Methods Speed Car Repairs

The new half-million dollar consolidated car repair installation at Potomac Yard, Alexandria, Va., and the new work schedules there, are making it possible for bad-order cars to be repaired and forwarded from 12 to 36 hours faster. This consolidated car repair operation is but one phase of a $5.5-million expansion which will speed the movement of all cars through this vital "gateway to the South."

Luminaires rated at 400-w are suspended over the platforms to produce illumination intensity varying from 2 to 8 ft candles. Ther illumination pattern necessitated the off-center location for these lights.



Potomac Yard, owned and operated by the Richmond, Fredericksburg & Potomac, is located just south of Washington, D. C. Not only is the classification of RF&P trains accomplished there—principally cars for or from the Atlantic Coast Line and Seaboard—but also classified are trains for and from the Baltimore & Ohio, Chesapeake & Ohio, Pennsylvania, and Southern.

New yards and new operating methods on these proprietary lines are making it necessary to rebuild Potomac Yard so that it will continue to be in step with the expedited freight operations of all six railroads. When completed, both northward and southward yards will have increased track capacity and will be completely automatic.

A first step in this big overall

(*Continued on page 50*)

ELECTRICAL SECTION

Mastiff and chihuahua—The engineman looks down from the cab of the 8,500-hp gas-turbine-electric locomotive.

UP 8,500-Hp Turbines Ready to Roll

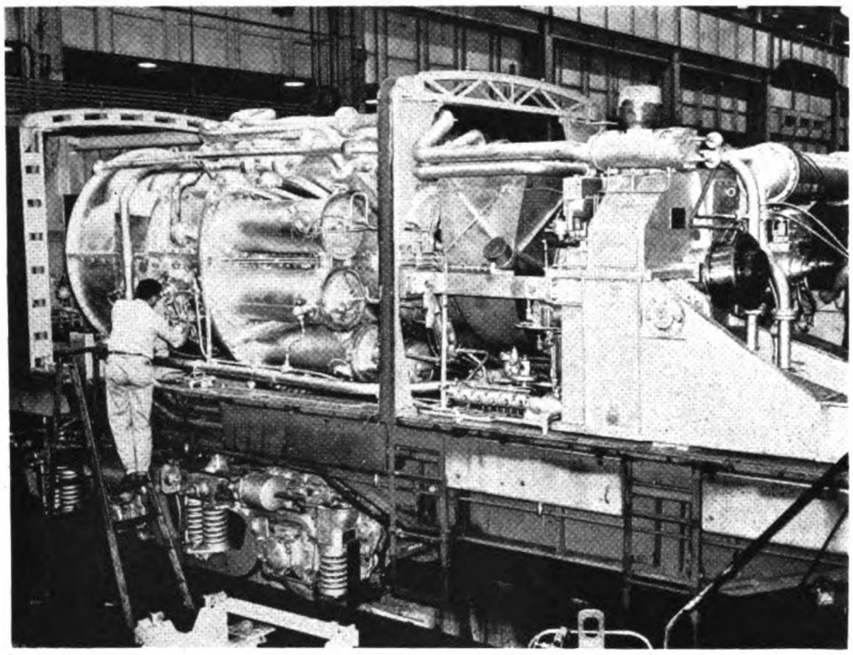
Locomotives can haul 5,000-ton train 1,811 miles from Los Angeles to Omaha with only two intermediate stops for fuel

THE FIRST OF FIFTEEN 8,500-hp gas turbine-electric locomotives for the Union Pacific is now practically completed. The locomotives were ordered from the General Electric Company late in 1955. The original design was described in the January 1956 issue of *Railway Locomotives and Cars* and component parts were described in the July 1957 issue. Information on the completed design has been made available in a paper by F. D. Gowans, General Electric Company, presented before the December 1-6, 1957, annual meeting of the American Society of Mechanical Engineers.

The 8,500-hp gas turbine locomotives were designed and built on the basis of experience gained from the operation of 25, 4,500-hp units, the first 10 of which went into service in 1952. The Union Pacific still has a large number of steam locomotives operating between Ogden, Utah, and Cheyenne, Wyo., which it wishes to retire. For this purpose they have wanted a locomotive with more weight on drivers and a higher horsepower-per-ton ratio for the purpose of handling high speed, long distance freight.

All these factors are embodied in the new locomotive. It consists of two units and a fuel tender. It is 175 ft long overall. It has 828,000 lb on drivers, and will handle a 5,000-ton train at 17 mph, on a 76-mile, 1.14 per cent grade. Geared for 66 mph, it has 20 hp per ton of weight on drivers as compared with 16 on the 4,500-hp locomotive. Speed at continuous rating is 18 mph.

The A unit is essentially an auxiliary. It carries an auxiliary diesel



No aisles or runways are possible in the B unit since the diameter of the turbine is 10 ft.

engine, a cooling system for the engine and the gas turbine lube oil, two air compressors, air brake reservoirs, control, a 2,500-gal fuel tank which supplies the diesel engine at all times and the turbine during starting, and other auxiliary components. The only main power components in the A unit are the six traction motors, control for these motors and braking resistors for eight traction motors.

Other main power components: the gas turbine generator set, six traction motors, control for these motors and braking resistors for four motors, are arranged in the B unit. Each unit is carried on two three-axle trucks with all axles motored.

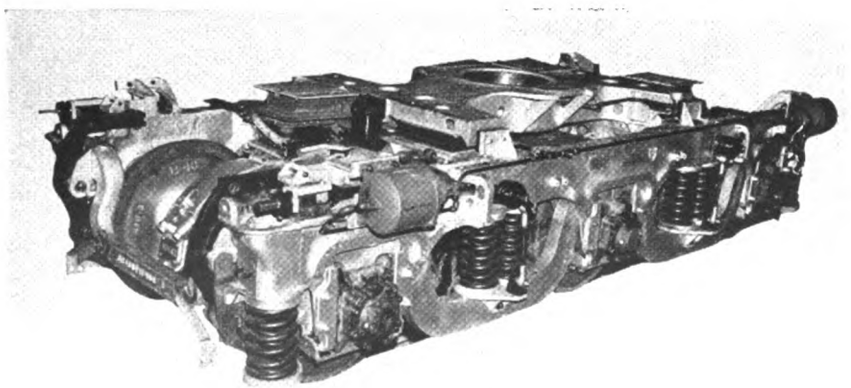
Heavy fuel for the gas turbine is carried in the tender coupled to the rear of the B unit.

With the main power source, gas turbine, and generators located in the B unit, it is necessary to connect power circuits between units in order to supply the traction motors and dynamic braking grids in the A unit. These connections are arranged in panels on each side of the end doors with quick disconnects so they can be uncoupled easily. Electrical control, a diesel fuel line, two water lines and the usual air brake lines also connect between these two units. The fuel line supplies diesel fuel to the gas turbine during the starting cycle, and the water lines connect the turbine lube oil cooler on the B unit to the radiator system on the A unit to consolidate the cooling system. These 2½-in. lines are located at the roof section. The flexible hose connections are supported in horizontal loops to give the flexibility and radii necessary for this size hose.

Connections between the B unit and the tender consist of the heavy fuel oil supply and return line, electrical connections for heating and lighting the tender and a tracer line for keeping this fuel line warm.

The diameter over the turbine casing in the B unit is 10 ft, requiring the full width of the cab to accommodate it. The four main generators are supported on a platform integral with the turbine gear case in order to simplify the alignment problem and to allow a completely integral power plant design. The overall length of the power plant, from generator to turbine exhaust tail cone, is 41 ft. Because of the unusual length of the unit, and the deflection and twisting normally encountered in a locomotive platform, the method of support is of considerable interest. The generator gear unit and the turbine are inter-connected and mounted on the platform by means of a flexible shaft coupling and a dual three-point casing support arrangement. This connection permits twisting of the turbine with respect to the generator gear unit while maintaining alignment. Two flexible legs support the generator gear unit on the platform, and a centering pin in the plane of these legs engages a recess in the platform to take the buffing and coupling shocks. Two flexible legs and a key support the turbine unit to the platform. The legs are welded to the platform and support the generator gear and turbine units by means of trunnion bearings attached to the lower casings. The legs are flexible only in the longitudinal direction; laterally they are quite stiff. The purpose of the flexible legs and the key is to permit freedom of longitudinal movement of the entire unit around the buff pin to care for expansion and contraction with temperature changes.

The angle of the exhaust gas tail cone, 30 deg upward from the horizontal, adds to the overall length of the turbine, but is a means of improving the locomotive performance. In addition, difficulties encountered from exhaust gas recirculation in tunnel entrances will be largely overcome. The 4,500-hp locomotive must travel 2.3 mph faster than the air in a tunnel of 410 sq ft cross section, in order to avoid any re-



The truck bolster is supported on four rubber pads. Stability of the truck is maintained by shock absorbers between bolster and side frames. Tractive and buffing forces are carried from the bolster to the truck frame by lugs on the bottom of the bolster.

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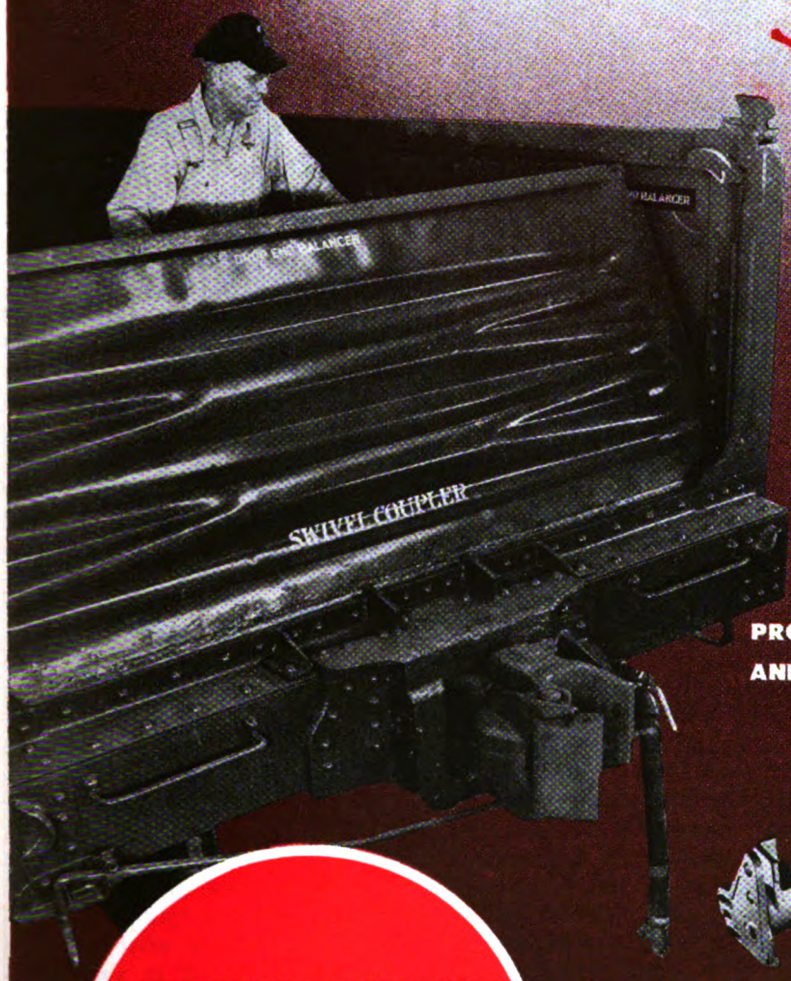

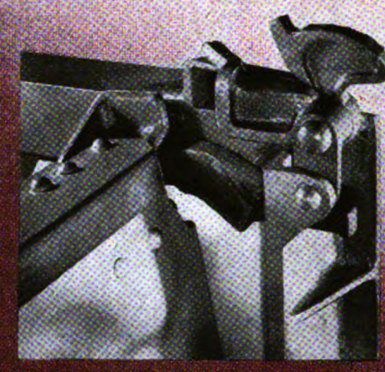

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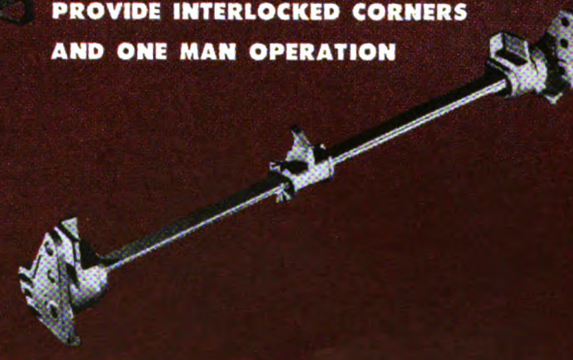

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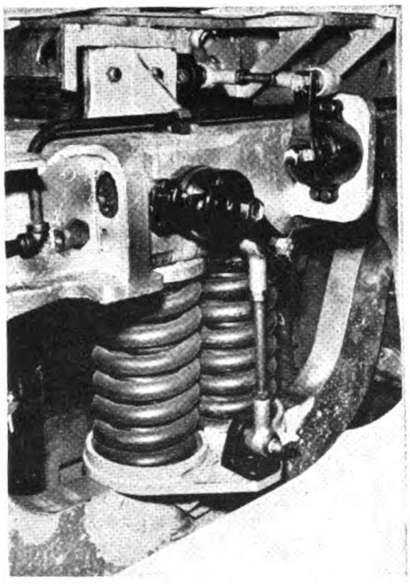
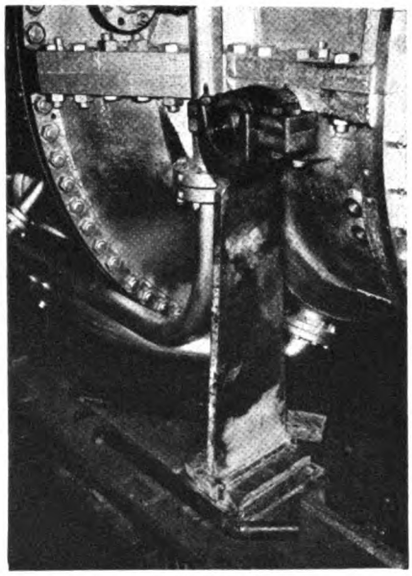
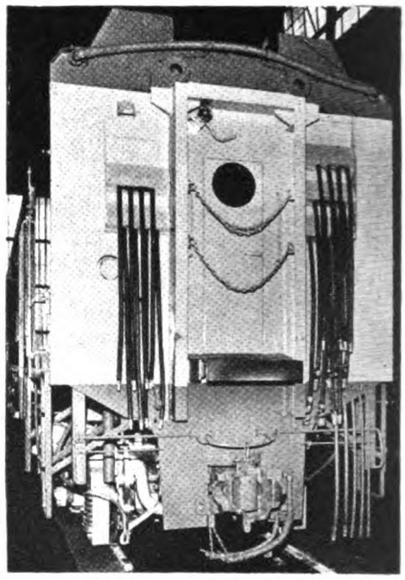


Detail of one of the trucks showing the hydraulic shock absorber.



Flexible leg and trunnion for supporting the turbine from the platform.



Rear end of the A unit showing connections between cabs.

circulation of exhaust gas. The 8,500-hp locomotive needs to run only 1.4 mph faster than the 4,500-hp locomotive to achieve the same performance at the tunnel entrance. The higher horsepower capabilities of the new locomotive enable it to run 25 per cent faster with its rated tonnage than the 4,500-hp locomotive.

Platform and Cabs

Removing heavy fuel from the locomotive to the tender and designing for a nominal 68,000 lb per axle, required that considerable weight be built into the A unit structure, since this unit, which would normally carry the fuel, now carries auxiliary equipment only. Structure numbers and sheets are heavier than would ordinarily be required and the top and bottom plates ofthe platform are 1½ in. thick. Based on usual design practice, there is 80,000 lb built into the unit for ballast alone.

In contrast to the A unit, the B unit structure, with its 150,000 lb of power plant, has been designed very carefully to meet the specified axle weight. High tensile steel is used in the sills, deck plate and draft gear housings. The sills have been reinforced by means of a fish belly 12-ft long at the center of the span to maintain normal platform deflection and to accommodate the turbine lube oil sump and traction motor air duct to the rear trucks.

On the A unit, all the cabs are welded and become an integral part of the platform. However, the two end cabs are not fastened to the center cab. These joints are left free so that the loading and buffing stresses will be confined to the platform and not transferred into an integral cab structure.

On the B unit, only the front and rear cabs are welded integrally with the platform. The center cab, housing the power plant, is made up of a top and two side pieces. These are bolted to each other and to the platform. Any part can be removed independently of the others for work on the power plant. If desired, all the three pieces can be removed as a unit from the platform for removal of the complete power plant.

It was considered essential in a high-speed freight locomotive of this type, geared for 66 mph, to have a swing bolster truck. The bolster is supported on four rubber pads. These pads are built up of alternate layers of rubber and steel bonded together. Flexibility of the rubber in shear permits lateral motion of the bolster within design limits. The resisting force built up in the rubber as it moves sideways tends to restore or center the bolster when the lateral force is removed.

Tractive force and buffing force are transmitted from the bolster to the truck frame by means of lugs on the bottom of the bolster which engage the cross ties between the truck side frames upon which the bolster is supported.

Stability of the truck is maintained by means of hydraulic shock absorbers between the bolster and side frame and the equalizer and side frame.

All controls for starting and stopping the diesel engine and the gas turbine are located in the A unit. An engine panel with the necessary controls and indicators is mounted near the diesel engine, as is customary on diesel-electric locomotives. Controls for the gas turbine are located at the engineman's position. After starting the engine, these controls permit the engineman to hostle the locomotive using the diesel engine-generator connected to two traction motors. Speeds up to 20 mph can be obtained with the locomotive and loaded tender on level track. This feature provides for minimum operation of the turbine at idling and light-load conditions. Considerable saving in fuel is thereby realized at yards and terminals.

The turbine is started on diesel fuel because it is easy to ignite and is more fluid than the heavy oil at low temperature. The engineman simply pushes the starting switch. A pneumatic, cam-operated controller automatically controls the starting cycle, brings the turbine to idle speed and then switches from diesel to heavy fuel. It likewise controls the stopping cycle. Switching back from heavy to diesel fuel, it flushes the heavy fuel from the lines and stops the turbine.

6 Roll Them Out Like New

Cleaning Electric Machinery

Abrasive Scrubbing

The problem of dealing with embedded and mechanically adhering dirt on insulation has resulted in another cleaning method. This is the abrasive or scrubbing method, and is particularly suited to removing strongly adhering dirt particles. In this method a blast of air entrains some sort of abrasive material which strikes the insulation with a scrubbing action. Aluminum oxide powder, or sand; pellets such as corn meal, ground corn cobs, or walnut shells; or other suitable material is used.

This is a powerful cleaning tool and you have to be cautious with its use or you may get into trouble. Both the air pressure and the size of the particles must be carefully selected to avoid damage to the insulation. Heavy abrasive particles driven by powerful air jet will not stop after removing the dirt. They go on and cut through the protective varnish coat and rip the insulation to shreds, Fig. 8. On the other hand, heavy soft pellets driven at high speed will pound the surface. Although they may not cut, they may loosen the bond between layers of insulation. As a general rule, the higher the pressure and speed of the air jet the finer must be the size of the abrasive particles. With fine flour-like powder the air pressure can go as high as 90 lb. Only small amounts of powder should be mixed with the air. A nozzle approximately ¼-in. in diameter may be best with the fine abrasive. This lets you direct the jet into pockets and hard-to-reach places. Larger, heavier particles, such as ground corn cobs, may work best with air at 40 to 60 lb. pressure. These coarser particles may take larger nozzles—⅝ to 1 in. in diameter. The fine, flour-like particles mixed with large quantities of air are probably best for removing the thin, enamel-like film of grime or dirt adhering mechanically to the insulation surface. The fine particles are not very effective against heavy layers of grease and muck. These should be removed with solvent, or by washing, before the abrasive blast is applied. Larger particles, such as ground corn cobs are more effective in removing thicker layers of grease and muck.

Before the days of abrasive blast the imbedded dirt was usually removed by stripping off the paint or varnish with chemical paint removers. This was costly and dangerous, and usually resulted in rebuild-

(*Continued on page 40*)

This is the sixth article in the series covering heavy maintenance of locomotive electrical equipment, and the concluding chapter on cleaning.

Part 6 is written by J. W. Teker, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

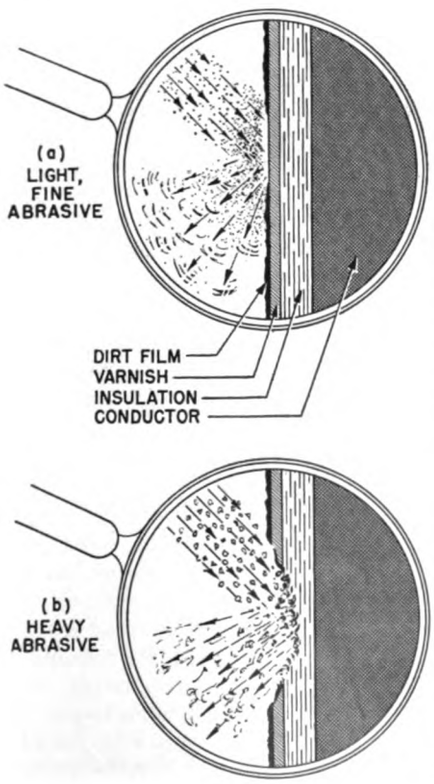


Fig. 8 (At left)—Good and bad air blasting practice

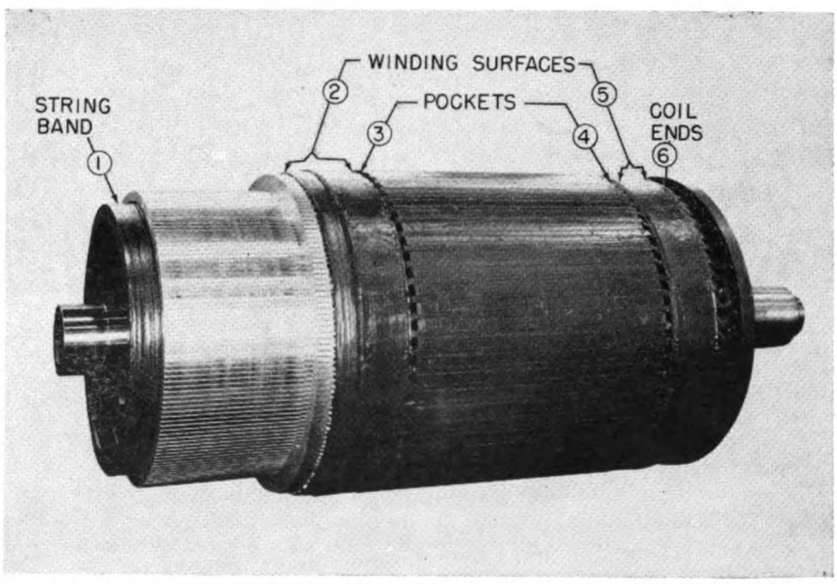
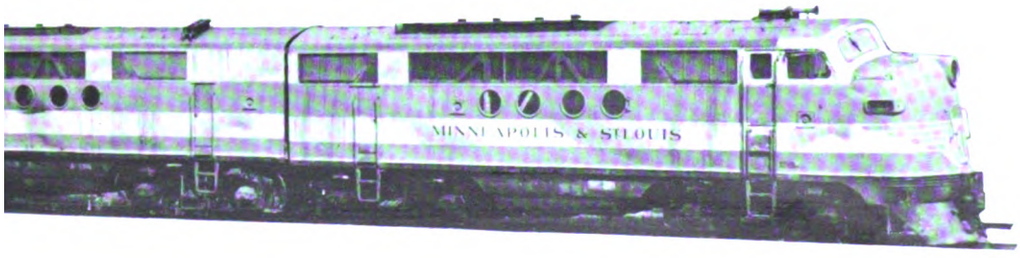


Fig. 9 (Above)—Typical sequence for systematic cleaning of an armature.



First units in the M. St. L. plan were the six oldest freight locomotives replaced with six General Purpose units. Subsequently, the second oldest group, consisting of freight units (like the one at left) has been turned in for versatile General Purpose units. Above are two of the General Purpose locomotives at work on the railroad today.

New locomotives for old . . .

The Minneapolis & St. Louis is building a new future from old freight locomotives by turning them in for new General Purpose locomotives containing certain remanufactured components. The advantages of higher horsepower and greater versatility are obtained at a cost substantially less than that of completely new units. Year by year, the M. St. L. plans to continue this program with additional older units as they too reach maturity.

How this or similar plans might benefit your roads' future can be had in detail from your Electro-Motive representative.

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ing the machine. The abrasive blast in the hands of a skilled worker is a very effective way to clean insulation. However, it also has its hazards. The operator should be protected with suitable respirators and goggles to keep the fine abrasive out of his eyes and lungs. Materials, such as corn meal must be kept dry or they will get lumpy and clog the machine. Also, they must be kept in tightly closed containers to prevent rats, mice and insects from getting at them. Corn cob grits, which are larger and have little food value, might be easier to store. Vendors of this equipment and material can make helpful suggestions as to the best selections for a given purpose.

The abrasive particles wear out nozzles. As with any tool, these require periodic maintenance and replacement. Like other means of cleaning, the abrasive blast method should be kept separate from the rest of the shop. This prevents the sharp abrasive material from spreading through the shop with resultant damage to machine tools and exposed equipment, and increase in the difficulty of good housekeeping.

One of the problems with this cleaning method is to know when to stop. Dirty surfaces are usually dark in color. As the dirt is scrubbed off by the blast, the normal color of the paint or varnish begins to show up in the clean areas. The color will, of course, be somewhat dull—not glossy like a new machine—because of the scrubbing or sanding action of the blast on the surface. Incidentally, this is a good preparation for the new varnish coat the machine will doubtless get before it leaves the shop. In addition to judging the appearance, the insulation resistance should be measured. Since the machine is dry and at room temperature the actual values specified for good insulation should be attained.

It is best to go about the cleaning job systematically, Fig. 9. For instance, in working on the armature, first clean the string band surface between the end of the commutator and the bead ring of the steel commutator cap. Next clean the surface between the commutator risers and the armature core. Pay particular attention to the pockets where the winding enters the core slots. Finally do the surface of the winding at the pinion end. There should be a definite change in insulation resistance as each of these surfaces is cleaned. Sometimes you may have to remove the armature steel bands and insulation to get at the dirt which may have accumulated under the bands. In any case this is probably desirable, for armatures can always stand a tightening of the bands.

Some of the areas of adhering dirt can be amazingly conductive. After a whole armature has been cleaned, the insulation resistance may still be low only because a hard-to-reach place has been overlooked. It is a good idea to have the armature arranged so it can be rotated as the work progresses. In this way the pedestal or supporting blocks do not interfere with the blast.

A general over-all dirt film presents many paths for electricity to leak across insulation surfaces. Hence, insulation resistance is low at first. As surface after surface gets cleaned up the escape paths become fewer, and the resistance should steadily increase. It's no use to go on blasting a surface that is already clean. Remember, there's no magic in blasting—it's what the blasting does that counts. If the insulation resistance stays low, there may be an electrical fault in some inaccessible part of the winding, such as an armature slot or commutator insulation.

Other Points to Watch

Dirty insulation that has been painted over is always a bad actor. There's a strong temptation to paint over insulation that is hard to clean. Sometimes this is done during running maintenance when the locomotive is urgently needed in a hurry. It makes the insulation look better but doesn't improve the creepage resistance. Electricity will continue to flow through the dirt even though it is under a layer of new paint. The painting job has only made it harder to get rid of the dirt. In fact, the part may have to be rebuilt, and that's serious. It would have been far better to let the insulation stay dirty until it could be properly cleaned. In any case, get to the bottom of the trouble. See that the insulation is clean and the resistance up to normal before doing any repainting or resurfacing.

Another frequently overlooked cleaning job is the air holes running through the armature core. In service, these get clogged with dirt, and the flow of air is restricted. Ultimately the equipment overheats. Ordinary cleaning methods are not likely to take care of these air holes. You have to give them special attention. Flakes of varnish, or even leaves and paper sometimes get caught in these passages and shut them off completely. It's a good idea to push a rod through the holes to break out any obstructions. This should be followed by a good cleaning to make sure the passages are ready for another term of service.

Ultrasonic methods of cleaning are yet in their infancy as far as railroads are concerned, although they have found considerable application in specialized industries. Most of the present applications are in the cleaning of small parts. These methods employ high-frequency electricity to produce extremely rapid oscillations in a cleaning solution. This sets up alternate high and low pressure waves in the liquid which mechanically scrub parts placed in the solution. Regular solvents or cleaning solutions may be used. The vibrations mechanically assist the cleaning action.

Find the Source

Prevention is better than cure, so anything that can be done to prevent insulation from getting dirty is better than cleaning the dirt off later. Along with its cleaning operations, a shop should study the nature of the dirt found in machines. Sample it to find out what it is, and determine where it comes from. Then see what can be done about controlling or eliminating it. For instance, there may be negligence in the installation and maintaining of air filters. Oil or engine exhaust leaks may not have been located and corrected properly. Another thing—study the air-flow pattern in the locomotive. See that it draws dirt away from rather than toward the electric equipment. These are some of the ways in which repair shop people can cooperate with the running maintenance group to make a hard-hitting team that will improve the maintenance and performance of a railroad.

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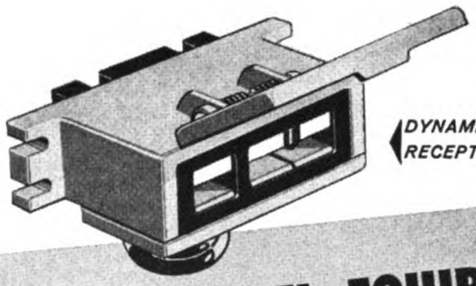

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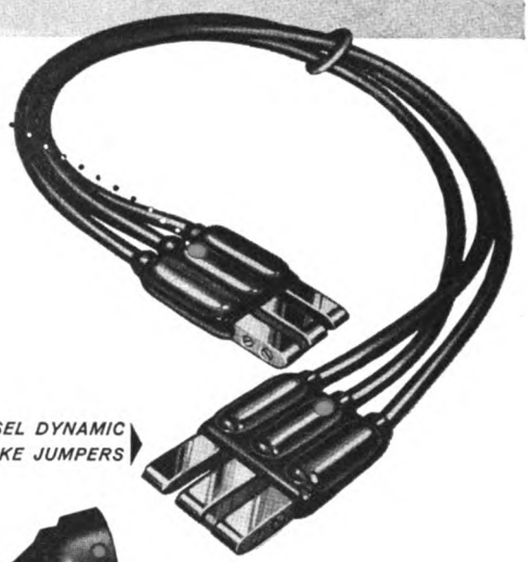

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CONTROL JUMPERS

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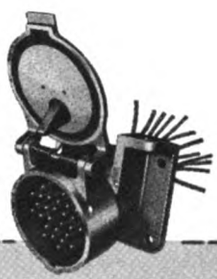

Note flexibility, illustrated by knot tied in cable.

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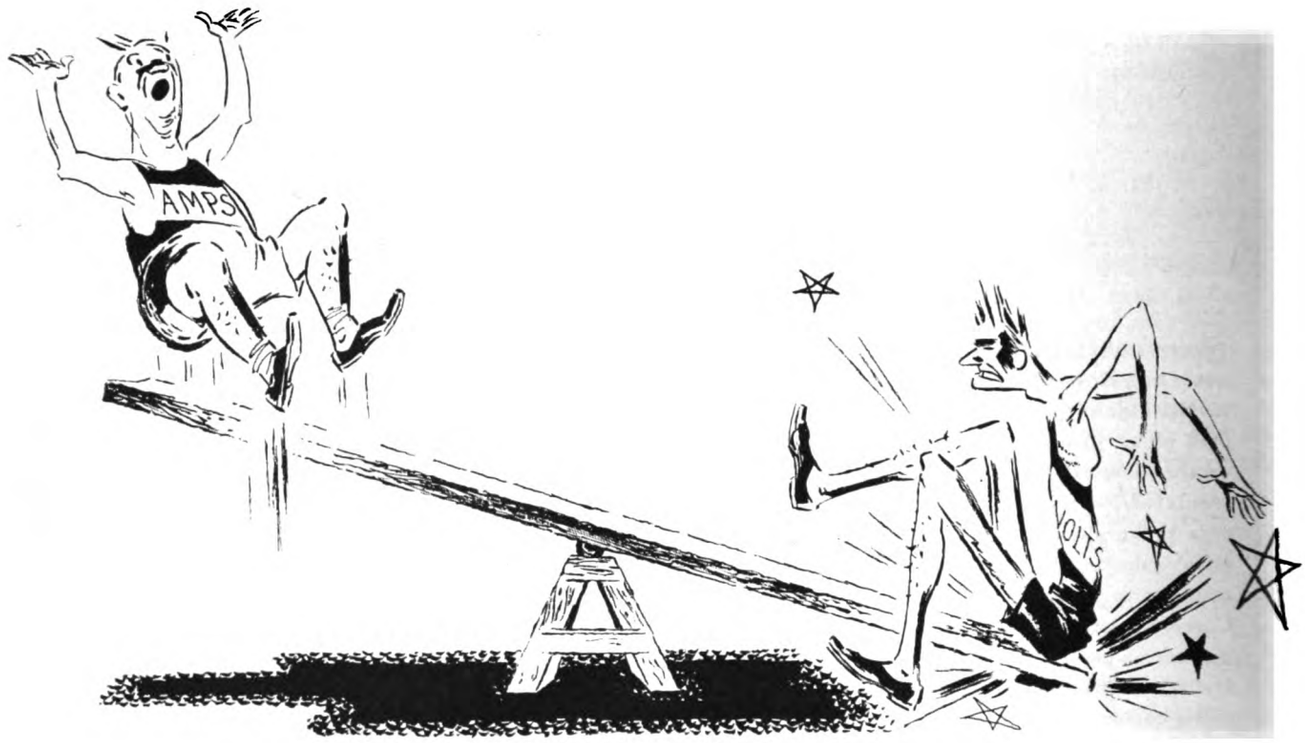

When Amps Go Up Volts Go Down

By Gordon Taylor

A main generator on a diesel electric locomotive had been very badly damaged on the SP&W due to a very destructive flashover. The flashover had been so destructive that it was felt that some unusual condition had existed to "trigger," or spark the flashover.

Our experience had taught us that a flashover usually occurs when a high voltage peak places the electric power system under such intensity of electrical pressure as to cause a current to flow over whatever leakage path may exist between two points of opposite polarity.

The spots most favorable for a flashover to start, are around the brushholders and the commutator of main generators and traction motors. It has been said "Fire makes room for itself." That is doubly true for the fire from the arc of an electrical flashover. On making room for itself the flashover brings damage to anything in its path. In this case the generator commutator and the armature windings had been so badly damaged as to require complete rewinding.

Our study of this case indicated that we should focus our attention on what might cause high voltage peaks to exist; which in turn would trigger a flashover across a leakage path.

The study was rewarded by our finding that the traction motor shunting circuits were inoperative. As a result, the motor fields were not being shunted during transition. This permitted high voltage peaks, that would not have existed, had the shunting circuits been closed at the proper time.

Some wiring changes in the control system had made field shunting inoperative. This was quickly remedied, and when a new armature was applied, the locomotive was back in business. This case did reveal the importance of field shunting, its purpose and how accomplished.

Many maintainers know in a general way about field shunting, but do not have a full understanding of the subject.

To appreciate the need of field shunting one must understand why we have transition (which includes field shunting) and that must include a knowledge of counter-electro motive force (counter emf) or counter voltage generated in a motor.

For traction motors to make most effective use of the power furnished by the generator, it is necessary to distribute the power according to the duty requirements of the locomotive. The constantly changing requirements, call for a re-distribution of volts and amperes from time to time, and this redistribution is what we know as transition. It involves changes of electrical connection or hook up arrangements of traction motors, including traction motor

(*Continued on page 49*)

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

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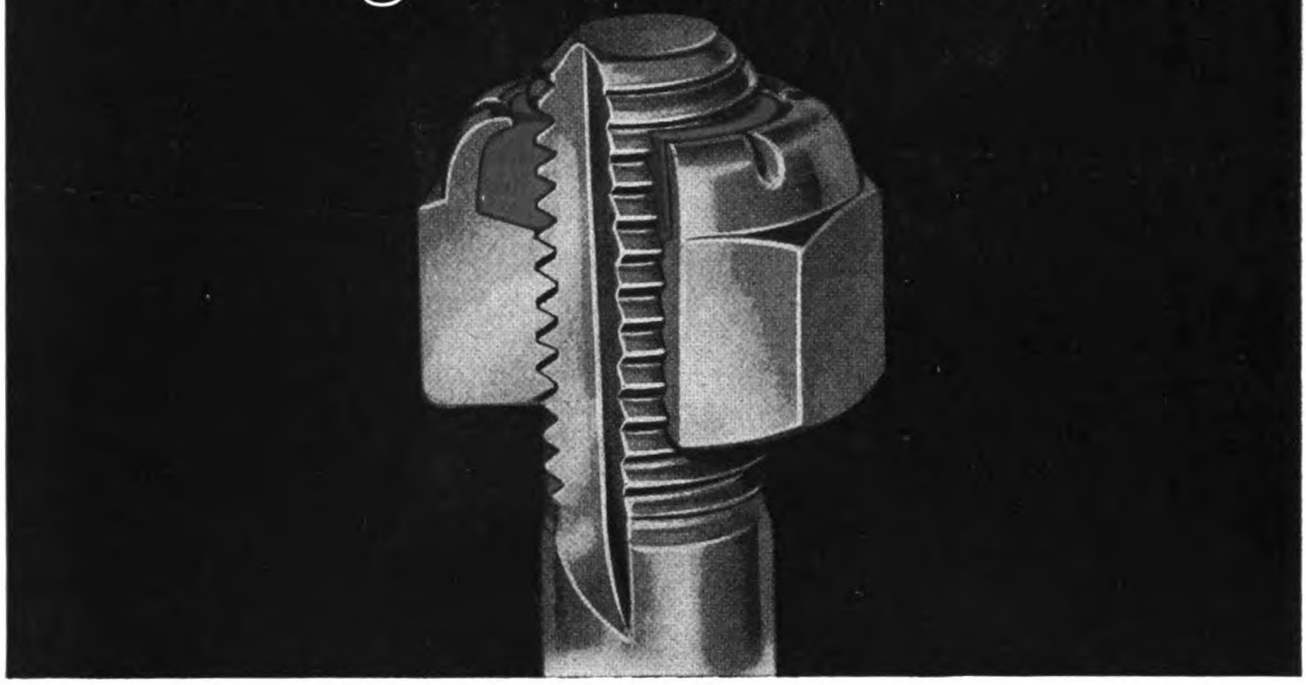

The nylon locking insert * will not seize threads, gall or remove plating

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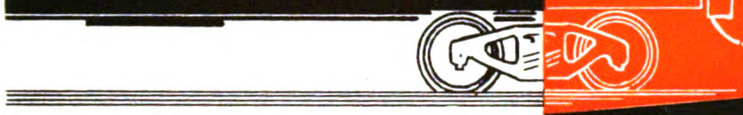

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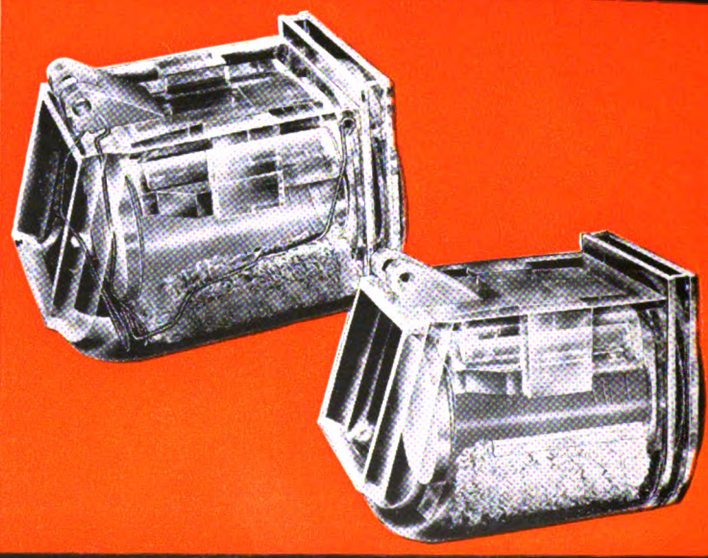

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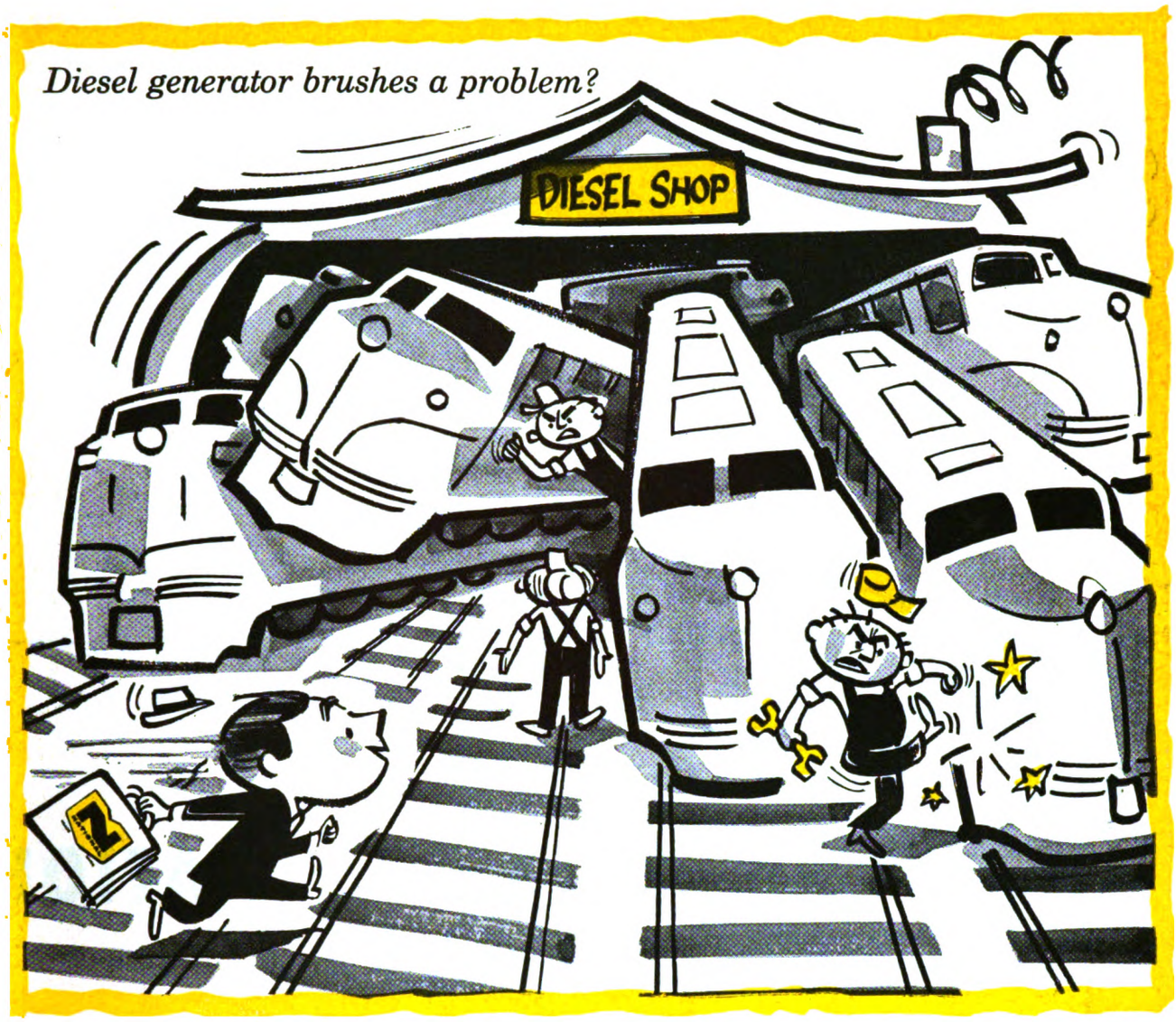
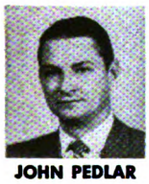


Your NATIONAL brush man helped this road stop excessive maintenance!



JOHN PEDLAR

Serious copper dragging and flashovers kept putting diesel main generators out of action on this mid-western railroad. The result, says "National" Carbon Brush Man, John Pedlar, was a critical repair and maintenance problem.

By carefully analyzing generator workload, John Pedlar, working closely with the railroad, found improper brush selection the source of trouble. Grade DE-2 "National" brushes were recommended and applied. The road now considers its generator brush operation completely satisfactory.

John Pedlar and his fellow "National" Carbon Brush Men have been solving railroad brush problems for years. Their experience and training – backed by "National" *long term brush development* – make them the logical consultants on any railroad brush problem.

Call your "National" Brush Man today. Or write National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

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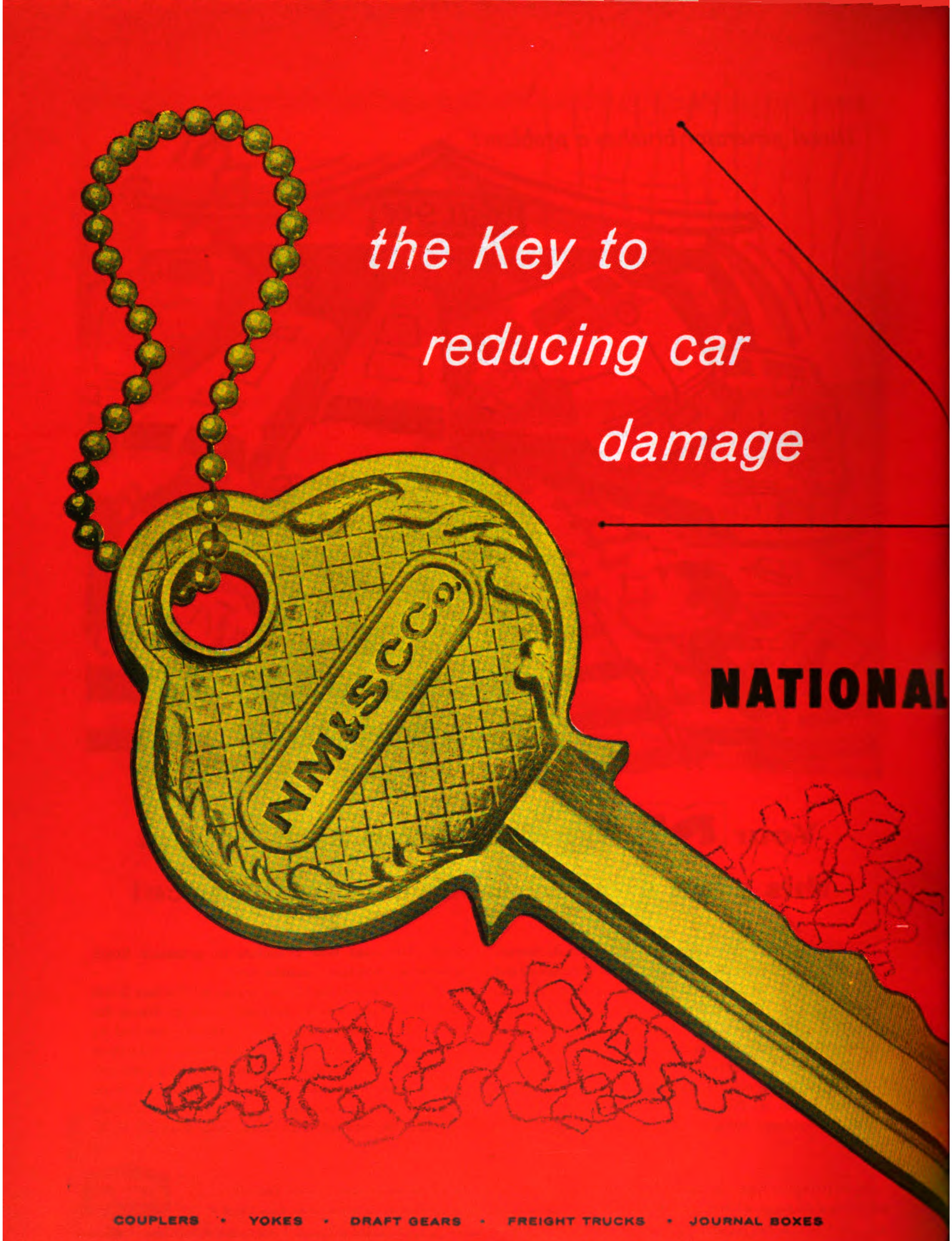
Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. *In Canada:* Union Carbide Canada Limited, Toronto.



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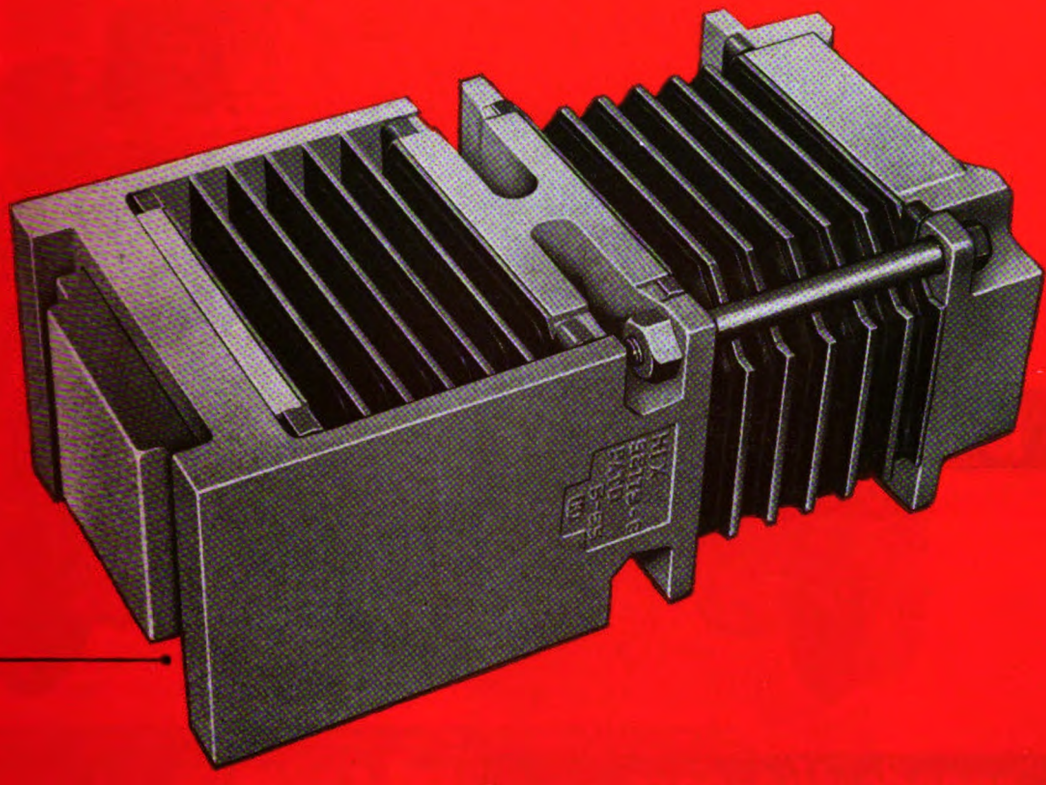

MF-400 RUBBER DRAFT GEARS

Rubber, when properly applied, is the finest cushioning medium known. In National MF-400 gears, correct gear design and proper application of the rubber cushioning compound reach their highest point.

In addition to a *rated* capacity of 42,500 foot pounds, National MF-400 Rubber Draft Gears have a *reserve capacity of 54%*—or a total of 65,500 foot pounds.

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

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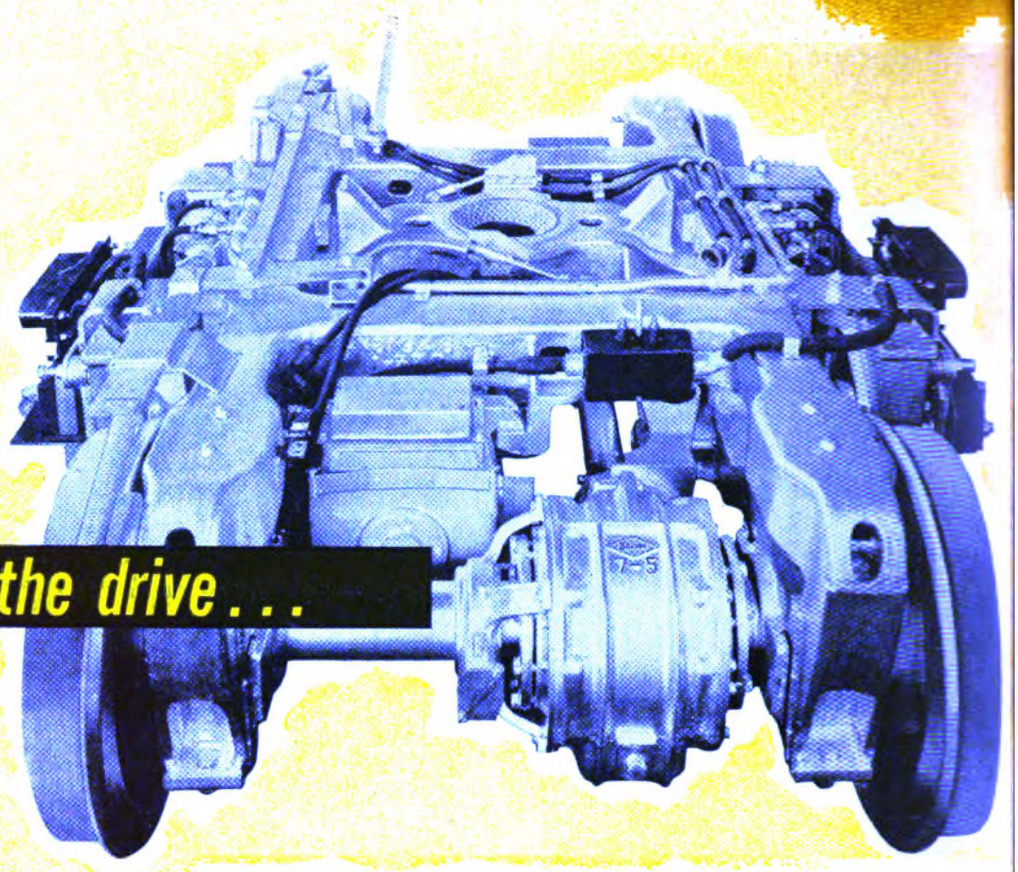
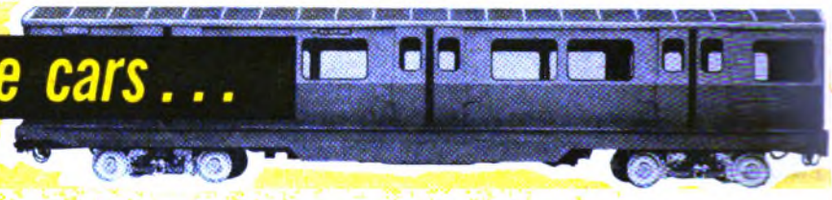
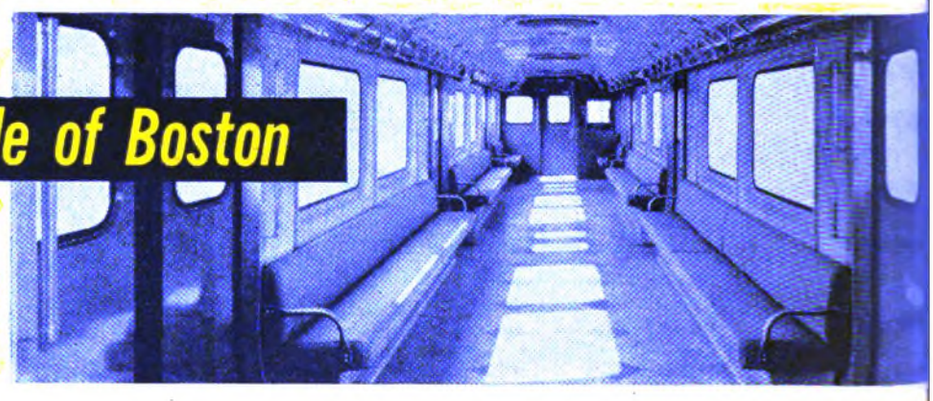


This is the drive . . .



that speeds the cars . . .



that serve the people of Boston

The Spicer Model 7-5 Traction Motor Drive now is in use in 50 new Pullman-Standard traction cars serving the Metropolitan Transit Authority of Boston, Mass.

This is a new Spicer Drive, developed to take advantage of the weight savings that are being incorporated into Rapid Transit car design through the use of lighter weight, higher speed electric motors.

The drive can accommodate hypoid gearing in ratios from 5.67 to 1 up to 9 to 1. The unit is furnished completely assembled, requiring no field adjustment, bearing alignment, or gear setting when installed.

More than 13,000 Spicer Drives of several types are now in use throughout the world. Write for technical bulletins, stating your requirements.

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INDUSTRIAL VEHICLES AND EQUIPMENT: Transmissions, Universal Joints, Propeller Shafts, Axles, Gear Boxes, Clutches, Forgings, Stampings.

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RAILROAD: Transmissions, Universal Joints, Propeller Shafts, Generator Drives, Rail Car Drives, Pressed Steel Parts, Traction Motor Drives, Forgings, Stampings.

AGRICULTURE: Universal Joints, Propeller Shafts, Axles, Power Take-Offs, Power Take-Off Joints, Clutches, Forgings, Stampings.

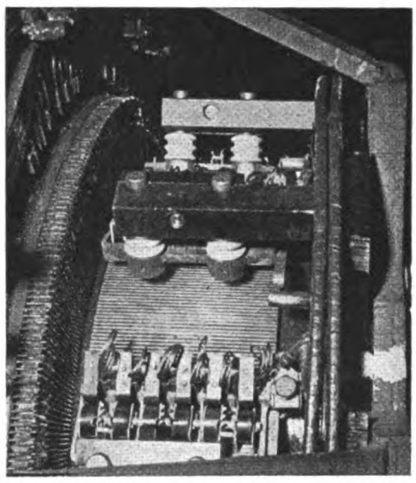
MARINE: Universal Joints, Propeller Shafts, Gear Boxes, Forgings, Stampings.

Many of these products manufactured in Canada by Hayes Steel Products Limited, Merritton, Ontario

DANA Spicer

What Are Some of the Operating Difficulties That Can Appear to Be Brush Trouble?

THE MAJOR SOURCES of operating difficulties that can appear to be brush trouble are itemized below. The sequence of the entries has no relationship to the order of magnitude of any given failure cause, or frequency with which any type of failure occurs.



Brush Breakage

When caused by: a. Improperly adjusted motor nose-piece suspension clearance or broken springs in this suspension.

b. Willful or careless disregard for wheel slip indication on the road, at starting and over crossovers or

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chines with proper number of pole shims.

i. Out-of-round commutator over the maximum limit for eccentricity.

j. Dirty commutator slots.

Flashovers

When caused by: a. Disregard for wheelslip indication.

b. Failure to connect shunts of brushes to holder.

c. Shunts frayed off through failure to arrange them away from the spring finger.

d. Failure to arrange riser track brush shunts away from main generator risers.

e. Ring fire from worn out brushes.

f. Inadequate spring pressure.

g. Dirty or low meg-reading machines.

h. Faulty jumper cables between units.

i. Mistakes in electrical connections.

The above are only the more obvious causes for troubles which, at first glance may be thought to be due to brush failure. There can be many other causes more obscure and difficult for the maintenance man to find.

BY K. R. MATZ
National Carbon Company

In a motor we have all the elements for generating an electric current, since we have rotating wire coils passing through magnetic fields. Although the motor is designed to deliver mechanical power when energized by current from an outside source, it cannot avoid generating a voltage within itself.

voltage is to limit or
current that is forced int
by the applied voltage fr
erator.

When the traction m
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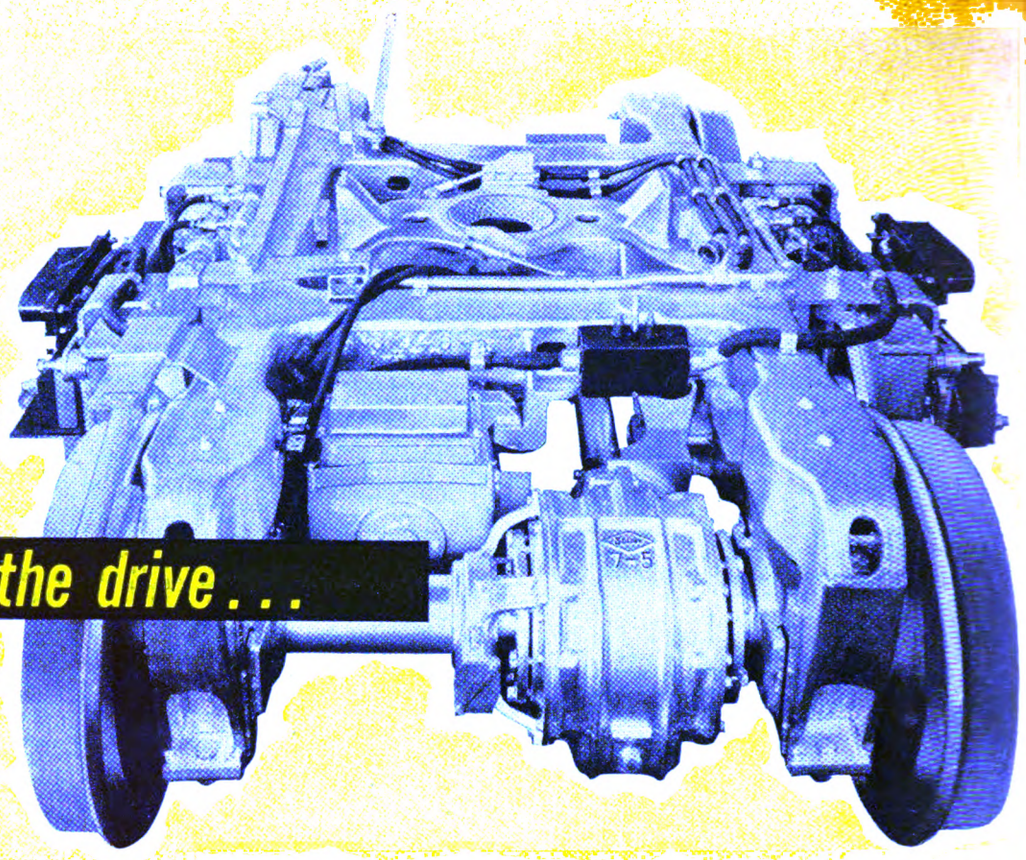
counter voltage is low

mits the motor to accept a heavy flow of amperes. As the train speeds up, the counter voltage increases, and the amperes received from the generator decrease.

In actual practice, the principal part of the terminal voltage in a traction motor at high speed is the counter voltage. The generator voltage is a comparatively few volts higher than the counter voltage from the motor. The production of coun-

(*Continued on page 62*)



This is the drive . . .

that speeds the cars . . .

that serve the people

The Spicer Model 7-5 Traction Motor Dr
in use in 50 new Pullman-Standard traction ca
the Metropolitan Transit Authority of Boston,

This is a new Spicer Drive, developed to t
tage of the weight savings that are being in
into Rapid Transit car design through the u
weight, higher speed electric motors.

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INDUSTRIAL VEHICLES AND EQUIPMENT: Transmissio oints, Propeller Shafts, Axles, Gear Boxes, Clutches, Forgings, Stampings.

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MARINE: Universal Joints, Propeller Shafts, Gear Boxes pings.

Many of these products manufactured in Canada by Haye Limited, Merritton, Ontario

DANA
Spicer

HOW MUCH DO YOU KNOW ABOUT BRUSHES?

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Brush Breakage

When caused by: a. Improperly adjusted motor nose-piece suspension clearance or broken springs in this suspension.

b. Willful or careless disregard for wheel slip indication on the road, at starting, and over crossovers or oil-slick rails.

c. Faulty bearings.

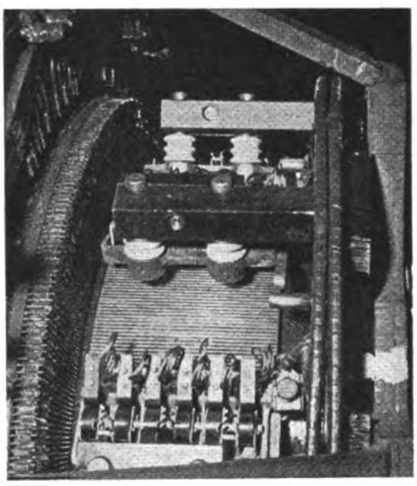
d. Overspeeding, sometimes with the tacit agreement of operating personnel who are forced to condone the practice to maintain schedules.

e. Allowing spring fingers to snap on brushes during installation or inspection.

f. Loose V-ings on the armatures.

g. A bad rail joint somewhere on the road.

This is the tenth of a series of questions and answers which are appearing each month.



Bar Burning

When caused by: a. Oil, grease, dust, or atmospheric contamination.

b. Overspeeding.

c. Loose V-rings or high resistance risers.

d. Maladjustment of brush holders.

e. Improperly spaced brush holders.

f. Incorrect electrical neutral setting of holders. (It can happen.)

g. Over-reduction of commutator bar face width due to careless slotting.

h. Failure to re-assemble machines with proper number of pole shims.

i. Out-of-round commutator over the maximum limit for eccentricity.

j. Dirty commutator slots.

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BY K. R. MATZ
National Carbon Company

When Amps Go Up . . .

field shunting at certain special times.

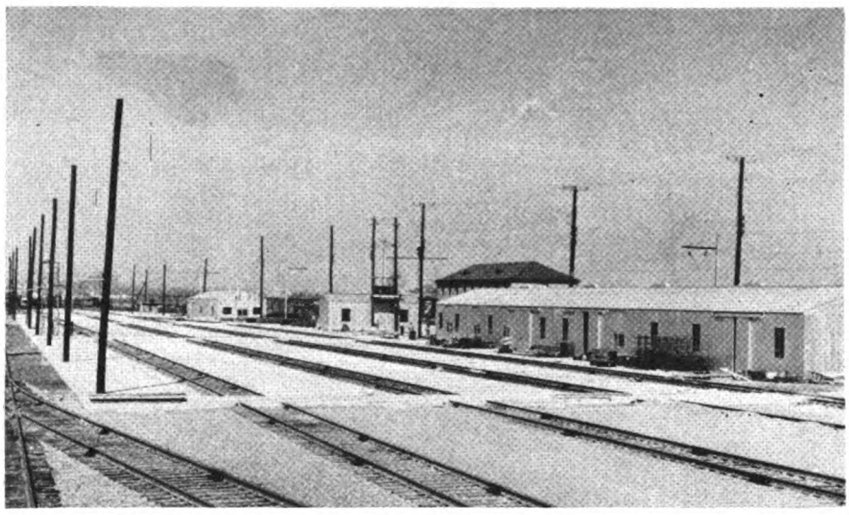
In a motor we have all the elements for generating an electric current, since we have rotating wire coils passing through magnetic fields. Although the motor is designed to deliver mechanical power when energized by current from an outside source, it cannot avoid generating a voltage within itself.

This is known as counter electro motive force since its voltage of pressure always opposes the applied voltage. The effect of the counter voltage is to limit or restrict the current that is forced into the motor by the applied voltage from the generator.

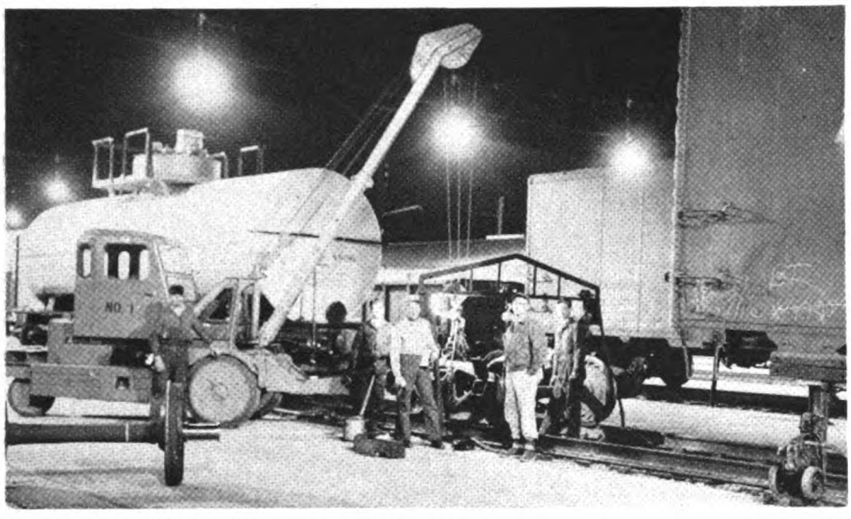
When the traction motor is starting the train, it draws a heavy ampere load from the generator, for the reason that at low speed, the counter voltage is low and this permits the motor to accept a heavy flow of amperes. As the train speeds up, the counter voltage increases, and the amperes received from the generator decrease.

In actual practice, the principal part of the terminal voltage in a traction motor at high speed is the counter voltage. The generator voltage is a comparatively few volts higher than the counter voltage from the motor. The production of coun-

(*Continued on page 62*)



Although still under construction large concrete work platforms, new buildings and lighting catenaries were installed when this photo was taken. Potomac built over 12,000 feet of new track.



Plenty of light and materials handling equipment are important. Some of Potomac's equipment: a 5-ton fork lift, two 6-ton crane trucks, three 1-ton flatbeds, and two 25-ton locomotive cranes.

(*Continued from page 32*)

plan involved the new car repair installation. There had previously been separate repair facilities for the two yards. Elimination of these provided space for additional southward classification tracks and for the proposed construction of a new hump for the northward yard. The new consolidated repair installation not only gave the space for yard expansion, but also made it possible to bring together the two separate work forces and put into operation new practices which speeded up car repairs.

The new installation consists of four repair tracks spaced on 26-ft centers. Two of these are used exclusively for repair of northbound cars and the other two are used only for southbound cars. Reinforced 8-in. concrete slabs form work areas for over 800-ft along both sides of all the tracks. Reinforced concrete jacking pads 24 x 24-in. run continuously along the edges of these platforms. The RF&P has found that the top of such a paved work area should be at the same level as the base of the rail rather than flush with its top.

Three new Armco metal buildings contain the individual shops and storage areas for the entire installation. The largest is 230 x 28-ft and contains the stores facilities, blacksmith shop, planing mill, air room, tool room, and paint shop. Two journal lathes and a wheel press are located in a separate 80 x 28-ft building. This shop does only journal work; all wheel work is done at the RF&P's main shop at Richmond, Va. The third building is an oil house for preparing and storing packing and lubricators. The locker rooms and offices are located in a two-story brick structure built at this site in 1942 and completely rebuilt in conjunction with this new shop.

All of these have produced a repair yard with a capacity of 55 cars. Studies were made of the possibilities of using the "spot" repair system, but it was found that similar results could be achieved by making it possible to do night work in the facility which has been built.

The essential factor in the night operation is the lighting. This consists of 48 Westinghouse 400-w mercury - vapor Luminaires hung from transverse catenaries over the repair tracks. The catenaries are located approximately 100 ft apart. The resulting illumination varies from approximately 8 ft candles under the fixtures to approximately 2 ft candles midway on each platform between the fixtures. This has proved to be a satisfactory lighting level for car repair operations.

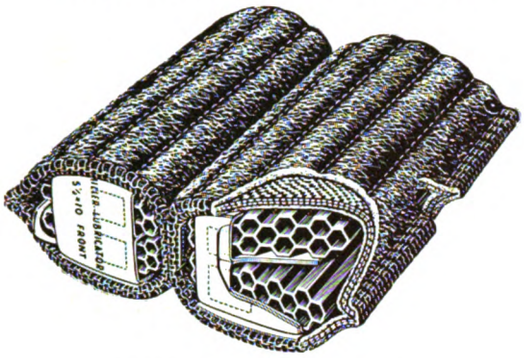
Light car repairs have not been placed on an around - the - clock schedule. Instead, there is a day shift from 8 am to 4 pm, and a night shift from 8 pm to 4 am. This gives two intervals of four hours each when the tracks can be switched. With this, cars are always forwarded at least twelve hours sooner, and many proceed 24 to 36 hours faster than they could under the old system.

This has produced a more efficient and economical repair system. Its price has been a small increase in the total force. However, overtime has been virtually eliminated, and there is the more intangible asset of less delay to loads found with defects.

Cars handled through this yard average between 4,000 and 6,000 daily. On a typical day recently, the first shift repair forces turned out 60 cars and the second shift 37. Total car department employees at Potomac Yard including inspectors on three shifts and car repair forces on two shifts number nearly 350. Less than 60 of these, however, are involved in the actual car repair operation.

FOR PROGRESSIVE RAILROADING

145,000 CARSETS TO DATE



MILLER LUBRICATOR

LUBRICATION RESULTS: 1954 vs. 1957 ON 600 LOG CARS

- Up to and including 1954 these were the MOST DIFFICULT cars on the railroad to lubricate.
- During 1955 and 1956 MILLER PADS were applied, bringing immediate improvement.
- DURING 1957, when COMPLETELY EQUIPPED with MILLER PADS, THESE SAME CARS became the BEST OPERATING CARS on that Railroad. THE IMPROVEMENT WAS 50-FOLD!
- 50 to 1 improvement by applying Miller lubricating pads at $40 per carset.

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Time is money, and you can save **plenty** with TOLEDO Pipe Tools. This DROP HEAD RATCHET THREADER, for example, the handiest tool you will ever own, gets plenty of daily use. When dies are to be changed, you're sure it's a better buy, for a simple pull on the pawl and the die slips out. It's typical of TOLEDO tools — every feature is designed to save time . . . and money . . . . for **you.**

Ideal for Close Corners—if you have room for a 30° swing, you can use a TOLEDO. Light, and easy to use, it saves time when you need it most.

Instant Die Change—dies can be changed in a few seconds—fit pipe or conduit from ⅛" to 2", and available in a range of three sizes.

Choice of Die Heads Left-hand and electric conduit dies also optional. Compact for minimum clearance.

Rust-Resistant Finish—rifle barrel handle finish is practical and attractive. Ball end is more convenient and gives a better grip.

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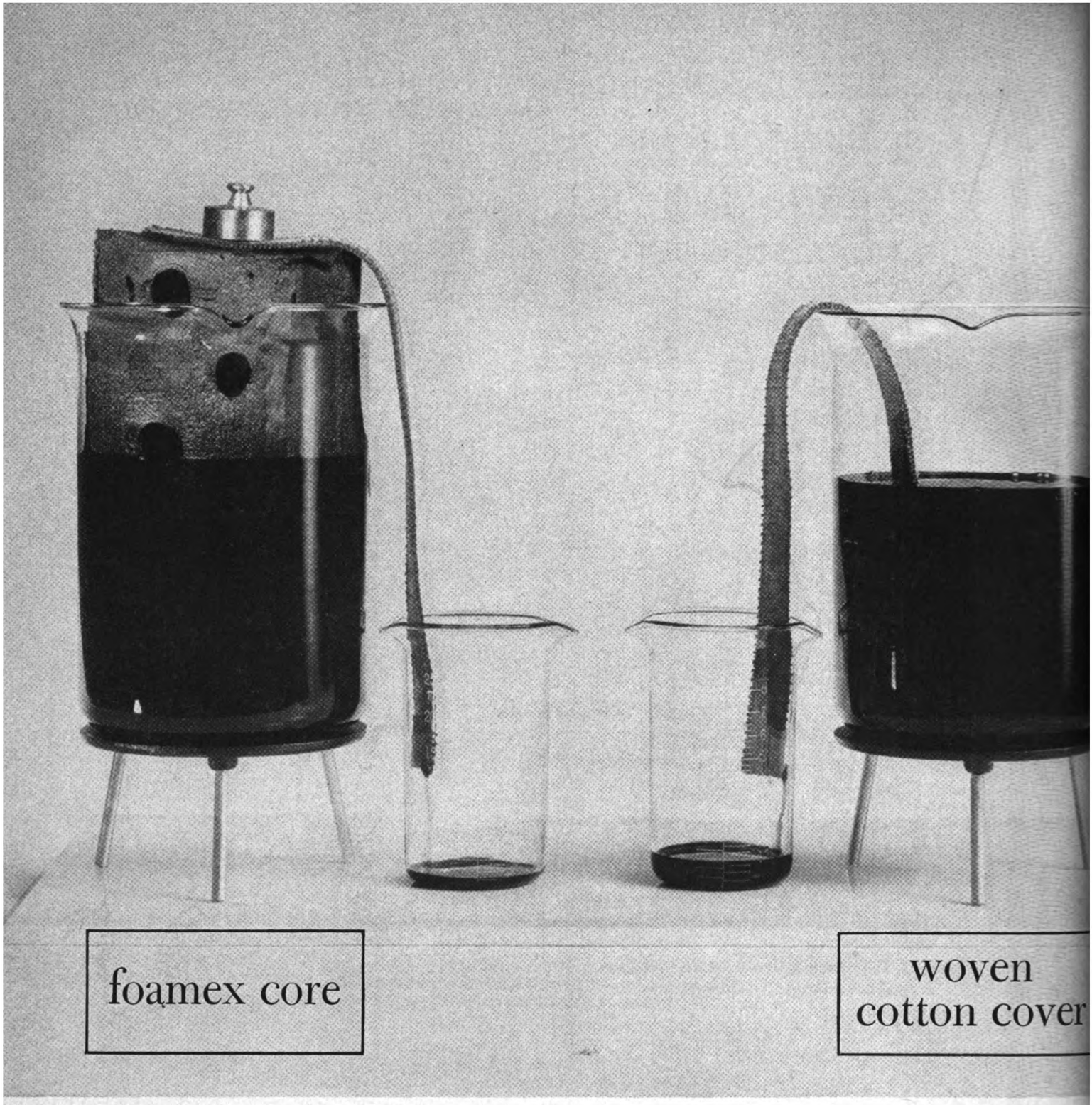
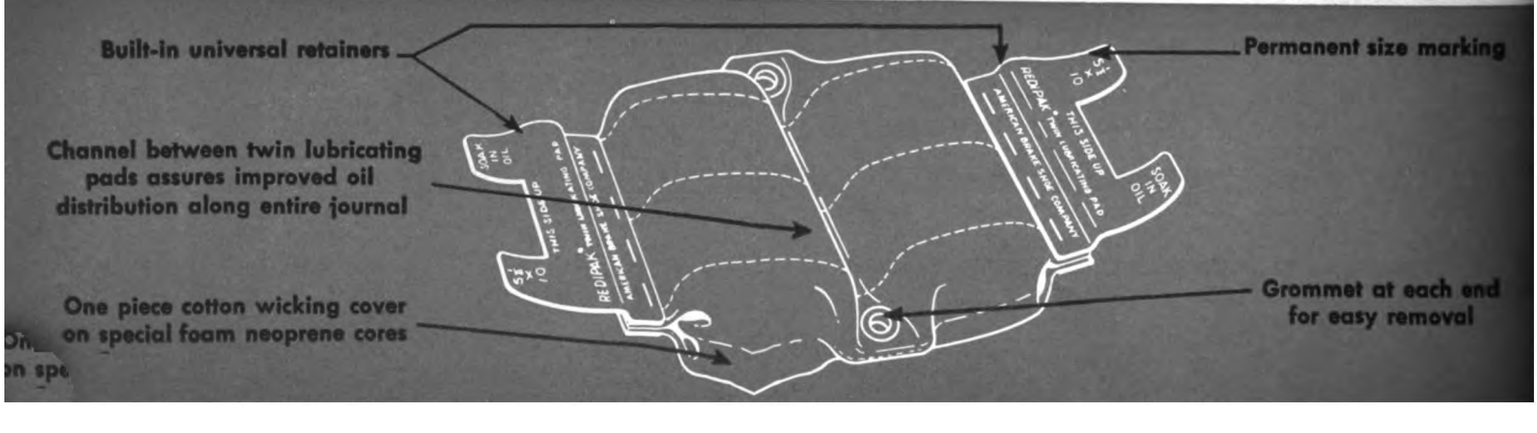


Both core and cover wick oil!

Both the cotton cover and the Foamex core in Redipak Twin lubricating pads move a steady flow of oil to the journal. The woven cotton cover, unmatched in wicking ability, is lint-free. The foamex core not only provides the proper resilience, but it, too, wicks oil when saturated . . . all adding up to doubly effective lubrication!



Why Redipak® Twin Pads with Firestone* FOAMEX® provide superior lubrication

Superior lubrication that will effectively control hot boxes is assured with Redipak Twin lubricating pads, because of their unique design and the excellent lubricating properties of their woven cotton covers and Firestone Foamex cores.

Take the Foamex core . . . more than just a mechanical filler, this material, which is produced by Firestone to our physical specifications, actually wicks oil when saturated, holds over five times its own weight in oil, and keeps its shape and resiliency under extremes of temperature.

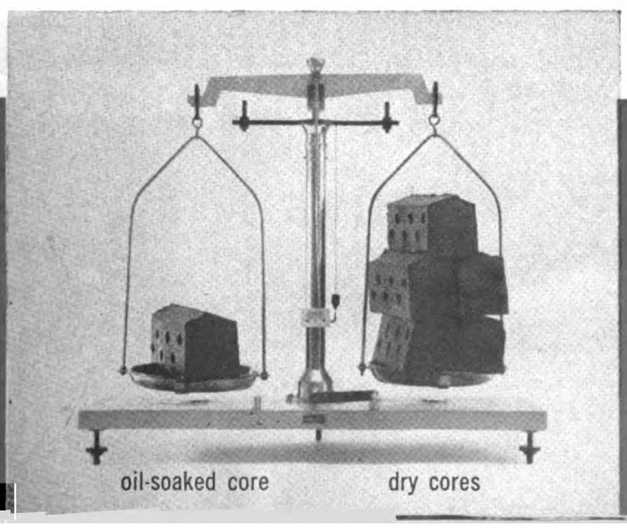
The wicking ability of cotton hardly needs explaining. When woven into a seamless cover for Redipak Twin pads, the result is a highly efficient wicking material that will not lint or glaze. Add to these properties, a unique design that provides superior oil distribution and positive shift prevention and you have Redipak Twin lubricating pads.

*A special formulation of Foamex is used for Redipak Twin pads.

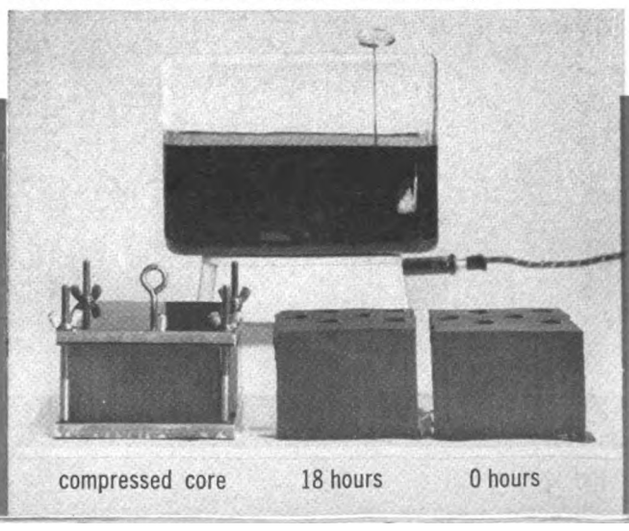
AMERICAN Brake Shoe COMPANY

RAILROAD PRODUCTS DIVISION
530 Fifth Avenue • New York 36, N. Y.

Redipak's Foamex core holds over 5 times its weight in oil! Redipak Twin lubricating pads hold an amazing amount of oil. Why? Mainly because of the Foamex core with its millions of interconnected cells. One sample of oil-soaked Foamex weighs as much as five and one-half dry samples of the same size . . . in other words five times its own weight in oil. Thus, the Redipak Twin core provides a generous oil reservoir—even when there is accidental loss of free oil.



Redipak Twins keep their shape: The Foamex cores in Redipak Twin lubricating pads are produced to our physical specifications to resist taking a set under extremes of temperature. In this demonstration, adapted from actual production tests, one of two identically-sized samples has been compressed to 80% of its original height and immersed in oil at 250° F for 18 hours. At the end of that time, there was no difference in height between the tested sample on the left and the untested sample on the right. Despite compression under heat, the Foamex core held its shape.



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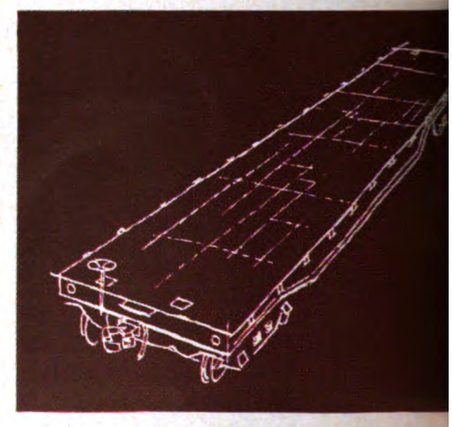
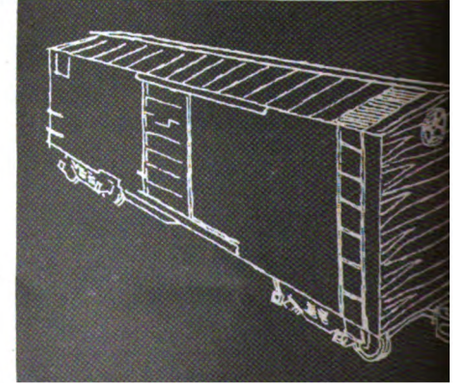
The Griffin EQS wheel comes in fewer tape sizes... accurate in all other dimensions to .020" tolerance ...almost perfectly balanced...and with strong, uniform flanges and rims.





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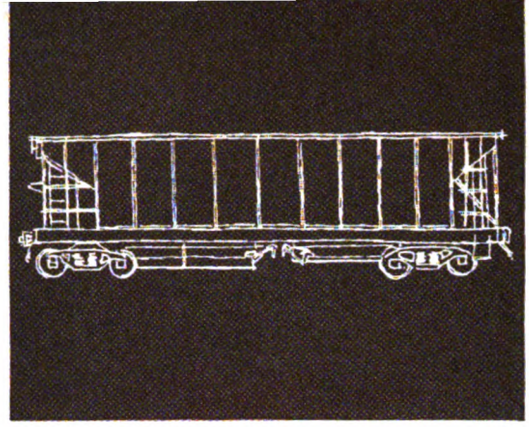
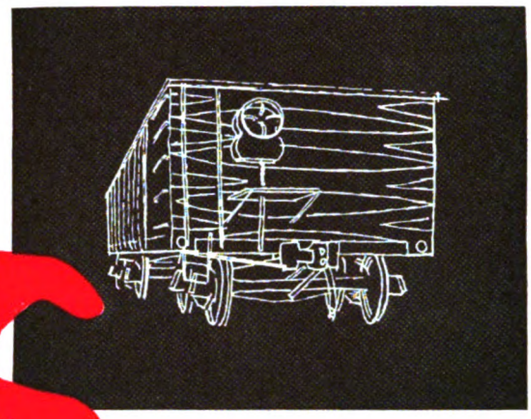
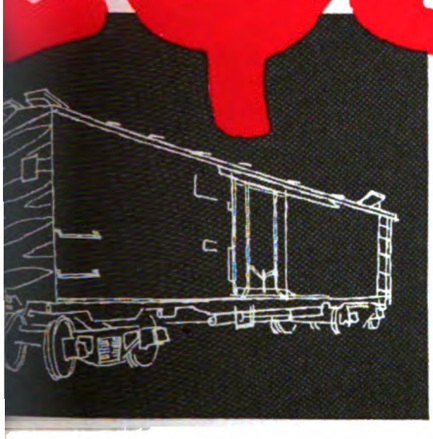
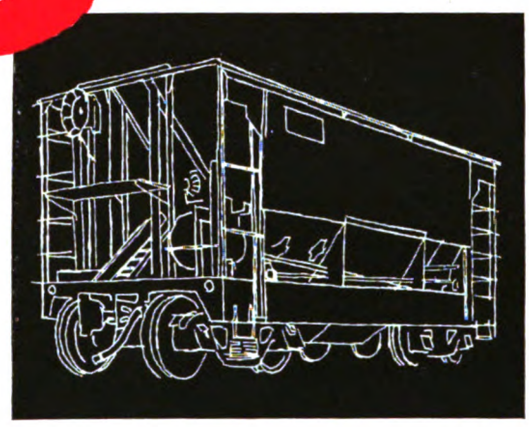


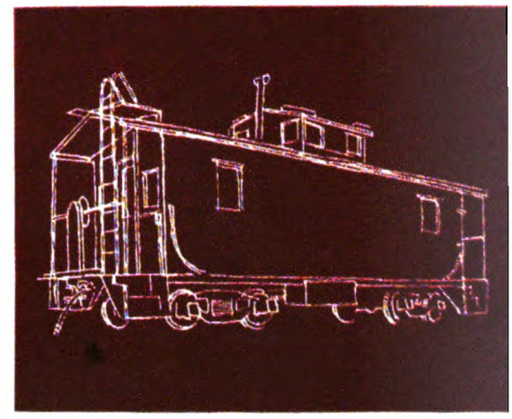


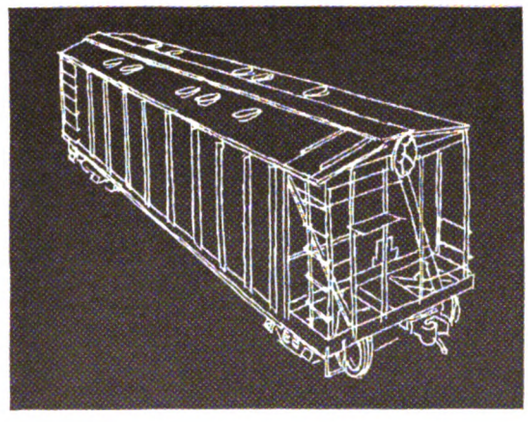
EQS

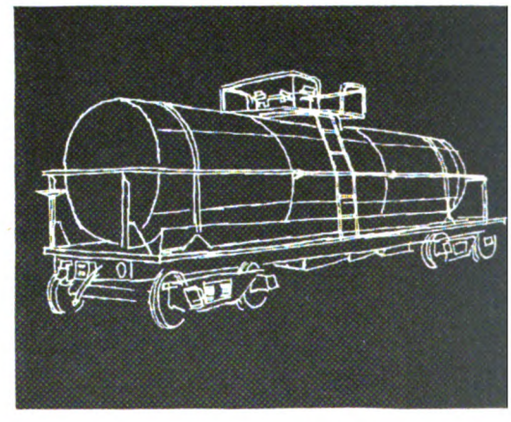
ELECTRIC QUALITY STEEL

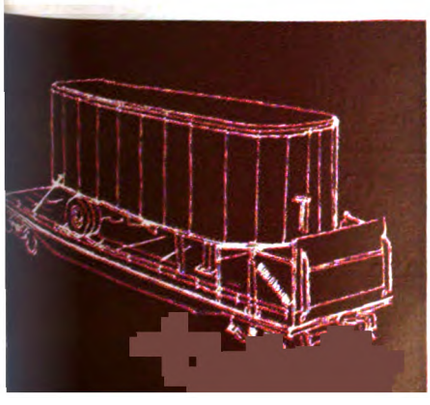


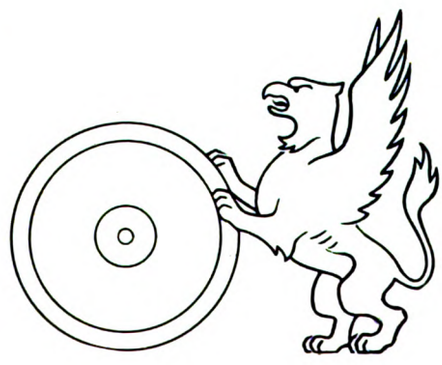












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PROBLEM PAGE

Riding Comfort of Passenger Cars

When a passenger car is reported as a "hard rider," what is checked and in what order is this work done? What is the most frequent cause of poor riding?

Many factors affect the riding comfort of railroad passenger cars, including truck design and maintenance, track repair and alignment, and carbody construction. The author* has found little difference in riding comfort between the four- and six-wheel trucks. Features of the modern truck are:

1. A one-piece frame with lined, integral pedestals to insure wheel alignment, and ruggedness to minimize maintenance.
2. Roller-bearing boxes, a "must" for smooth high-speed operation, without hot boxes.
3. High-speed brakes with wheel-slip control to insure a smooth, minimum-stopping distance.
4. Rubber-cushioned draft anchors for easy transmission of longitudinal forces from the wheels to the car body.
5. Equalizer coil springs to cushion rail impacts. Equalizers keep weight on both boxes in case of spring breakage, preventing derailments from this source.
6. Shock absorbers across the bolster springs preventing resonant build-up.
7. Fabric damping pads at springs, equalizer feet, and swing hangers to reduce transmission of noise and high-frequency vibrations.
8. Bolster suspension outside the truck frame for ready inspection and fast renewal of defective parts.
9. Swing hangers in combination with the shear deflection of bolster springs to produce soft lateral action.
10. The central bearing to prevent shimmy.
11. Resilient coil springs supporting the bolster on a wide spring base, providing roll stability for the carbody.

A poorly maintained truck will soon drive away traffic. The modern truck is designed for easy maintenance, but no piece of machinery can run indefinitely without attention. The one-piece cast-steel truck frame maintains its alignment indefinitely, except for wreck or abuse, and it is only necessary for the maintainer to renew worn parts to restore it to its original true condition.

Weight Distribution

To insure that the four corners of a car have equal spring deflections, it is necessary to know the actual weight carried by each spring. The weight of each end of the car may be obtained with a conventional track scale. The weight of each side of the car may be obtained by means of three-point support weighing where one end of the car is supported on a ball and socket with the weight distribution of the opposite end determined by electronic load cells. Both ends are similarly weighed and, by rolling the car through known angles, the location of the center of gravity longitudinally, transversely, and vertically may be readily determined. The overturning speed on curves can be determined when the vertical location of the center of gravity is known.

Proper brake application and slack control, negotiating curves with regard to speed restrictions, starting and stopping, and control of trains through changes in profile can contribute substantially to the riding quality.

Cylindrical-tread wheels have less tendency to hunt, and thus impart less lateral motion to the truck than do tapered wheels. The only difficulty is that they do not stay cylindrical long; after a few thousand miles they become worn so that the beneficial contour is lost.

Riding conditions affected by wheel unbalance and eccentricity were investigated by the AAR which found that "the detrimental effect of wheel unbalance on the riding of the test car was inconsequential when the total unbalance per wheel was below 2 lb at rim radius. The investigation of the effect of wheel machining shows that the limiting condition of wheel unbalance can be met by the semi-finish machining of wheels. Wheel-tread eccentricity (up to 0.035 in.) had no important effect on the riding of the test car."

The quality of track affects the ride. Correlation between track conditions and riding qualities has been established by a number of railroads by operating a ride recorder over their lines, and pinpointing rough spots for attention of the track department.

Spring Nose

The coil springs, themselves, may set up annoying vibrations, such as hum and rattle. Hum is of the order of 50 cycles per second and, when excessive, causes a rumbling sound within the car. Investigations show that this hum is caused by surge of the spring, which is a relative vibration of the middle coils with respect to the end coils. Insulation against transmission of this vibration to the car body has been partially successful. Rattle of springs

(Continued on page 58)

A paper presented by W. E. Burdick, engineer of tests, General Steel Castings Corporation, before meeting of Railroad Division, ASME, at New York, December 5, 1957. The topic was previously discussed in RAILWAY LOCOMOTIVES AND CARS in the following issues: March 1956, p 91; April 1956, p 70; and July 1956, p 70.

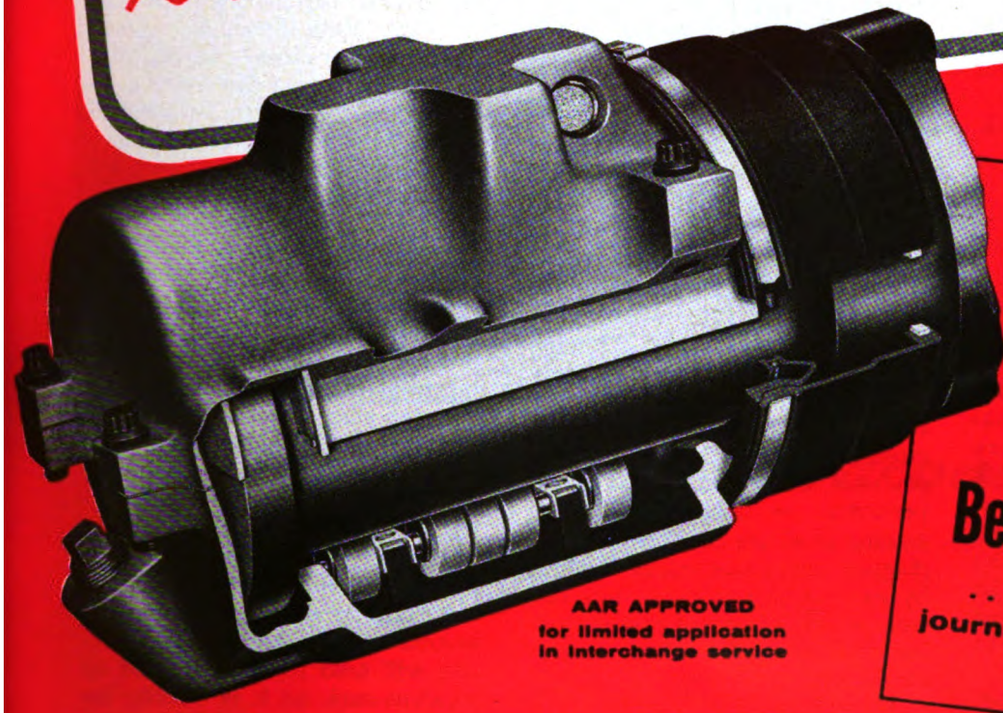
INSIDE STORY

of the economical answer to the HOT BOX PROBLEM

The Big Question: Could a permanent journal bearing conversion package be created that would require little modification and maintenance, cost less to buy and install . . . and end hot boxes?

Railroaders discussed an idea. It interested a prominent railroad which promptly put its top designers to work on it.

Bearing maker was called in to apply its experience and engineering resources to further development of the idea.



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Installation requires little time and only a few standard tools. Low cost renewal of all working parts.

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Problem Page

(*Continued from page 56*)

can become very disturbing. This appears to be caused by nested coils impinging on each other. The solution for this problem is to increase the diametral clearance between coils and to center them with each other.

Noise is often mistaken for rough riding, and proper noise insulation throughout the truck and car structure can do much to increase passenger comfort, particularly on sleeping cars. Noise and vibration annoying to passengers can originate in the end draft connections and diaphragms and are often mistaken for truck noises. Maintenance here is required, and much progress has been made in insulating these points with fabric damping pads. Rubber draft gears and tightlock couplers have helped to keep down the slack.

Test Equipment

The Three-Way Ride Recorder was developed by engineers associated with the University of Illinois and, since the war, has come into general use. The instrument records vertical, longitudinal, and lateral car body accelerations and, within its frequency response, reproduces the impressed accelerations with fair accuracy. Mileposts or other information may be coded on a chart by means of a marker. The chart is clock driven at 6 in. per min so that the distance between milepost marks, in seconds, may be used to establish operating speeds.

When more detail is desired, electric accelerometers are used. Motion indicators can be readily constructed from spring-steel strips with a strain gage. These strips are clamped to one truck member and driven by an adjacent member. Relative motions between the two produce signals which are calibrated and recorded on an oscillograph.

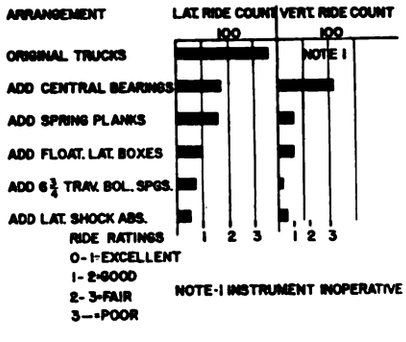
There are a number of accelerometers of the "impact-counting" type in use. These instruments totalize the disturbances reaching certain preset intensities and are useful in an overall evaluation of the riding qualities of a car. They do not locate points of disturbance.

A test program carried out on a problem car will illustrate the testing technique. This car, a bedroom-lounge, was reported for rough riding. It was equipped with inside-hanger trucks with the following characteristics: (a) conventional center plates; (b) roll stabilizers; (c) restricted lateral journal roller bearings; (d) bolster coil springs with 3¾ in. static travel.

Changes were made to this truck, one at a time, as follows: (a) central bearings replaced center plates; (b) spring planks replaced roll stabilizers; (c) free lateral boxes applied on new wheel-axle assemblies; (d) static travel of bolster springs was increased from 3¾ in. to 6¾ in.; (e) lateral shock absorbers were added.

The ride recorder was used to check the riding quality of the car and to provide statistical data or grading the ride. Runs were taken over about 12 miles of main-line track at practically the same speed and the car was in the same consist position. Since the test extended over a two-year period, wheel changeouts were inevitable, but most of the data was based on low wheel mileage with 1:20 treads. No check was made of wheel unbalance. Duplicate runs, when made, showed consistent results. The quality of the ride is numerically established by summating the excursions of the recording styli by lines crossed and obtaining the average per mile. Based on our riding experiences, we have established a grading of riding comfort. The bar diagram shows ride values obtained by each change made to this car, from which it is noted that the riding qualities improved from poor to excellent.

A serious ride complaint is shimmy, which is a lateral vibration in the range of 3 to 4 cps. It usually develops at speeds above 60 to 65 mph and is ordinarily associated with a slight tread wear. When double flanging is observed, it is often caused by shimmy. By retarding truck swiveling on tangent track, this mode of vibration can be checked. The central bearing rotates against a friction pad and thus suppresses shimmy. With swivel-control, shimmy has disappeared.



Bedroom-lounge car riding qualities were improved in six steps.

Oscillographic equipment is satisfactory for measurement of events in the riding range of frequencies. For higher frequencies in the sonic range—in fact, from 20 cps upward—vibration measurements can be made on equipment that will measure vibration amplitude and analyze the resultant waves. A tape recorder can be used to preserve these vibration patterns for later playback. With these instruments, annoying vibrations can be traced to their source and corrective measures taken. The eccentric oscillator can be used to trace the source of vibrations of 6 cps and upward.

Yaw Problem

With the exception of shimmy, the most annoying lateral vibration in a car is due to yaw; that is, when the front of the car travels to the left, the rear travels to the right. This is a natural mode of vibration and can be easily excited with the car at rest by a man using a crowbar. As the car travels along the track, the natural hunting of the wheels will seek out this mode, and can cause an almost continuous vibration to be sustained. The vibration will tend to be restrained by adjacent cars, so it is usually the most severe at the rear of the train. This motion is not particularly a function of truck design, since modification of swing-hanger length or angularity, spring stiffness or location, and other similar modifications will merely shift the natural frequency a slight amount.

Any means by which the hunting of the wheels can be checked, or kept from disturbing the truck, will improve this yawing motion. If it were possible to place the trucks on the percussion centers of the car, the coupling of the truck actions by the mass of the car would cease to exist, and each truck would respond only to its own track irregularities.

Main Line on the Taconite Run

This stretch of lonely, uninhabited country lies between Hoyt Lakes and Taconite Harbor, Minnesota. The railroad, operated by Erie Mining Co., is used to haul taconite from the great processing plant at Hoyt Lakes to the harbor on Lake Superior, 73 miles away.

The 389 hopper cars required for the system were built by Bethlehem at its Johnstown, Pa., shops. Each of the cars has a capacity of 95 tons, and when level-full holds 1433 cu ft of load. The four-hopper bodies are of riveted-and-welded construction, and the cars are equipped with Type F couplers, 36-in. multiple-wear heat-treated wrought-steel wheels, forged-steel heat-treated axles, empty and load and clasp brakes. Items such as these are an aid to safe, dependable service, and they help reduce maintenance and repair expense.

The cars are excellent examples of what Bethlehem can build in open-top designs. When your own requirements call for something of this nature, by all means check with our engineering division. We can design the type of car you have in mind, or work from plans that you yourself supply.

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QUESTIONS and ANSWERS

6-SL Brake Equipment

This series of Questions and Answers pertains to the 6-SL air brake equipment for switching locomotives. The references to the pamphlet, page and part numbers in the text indicates where the original material may be found in the manufacturer's technical publications and instruction pamphlets. Authorized persons may obtain a copy of Instruction Pamphlet Number 5046-15 which deals with this equipment by applying to the nearest district office of the Westinghouse Air Brake Company.

W263-Q—What additional air flow takes place?
A—At the same time, main reservoir air flows through a choked warning port to the exhaust opening to sound a warning as long as the handle is in sanding position.

W264-Q—How is sanding in the forward operation provided?
A—By moving the sander valve handle to the extreme right position.

W265-Q—Describe the air flow in the right hand position.
A—Main reservoir air is connected through a port in the rotary valve to port *13* and the forward sanding pipe, also through a choked warning port to the exhaust.

W266-Q—What is the position midway between Forward and Reverse?
A—Neutral position.

W267-Q—Is there any air flow when the sander valve is in Neutral position?
A—No. Main reservoir air is cut off from both sanding pipes in *Neutral* position.

Bell Ringer Valve Operation

Instruction Pamphlet 5046-15, Page 45 (Plate 1)

W268-Q—How is the bell ringer valve operated?
A—To operate the bell ringer valve, lower valve handle *187a* is moved to the left, out of *Neutral.*

W269-Q—What is the air connection in this position?
A—Main reservoir from chamber *C* is connected through the port in rotary valve *179a* to port *10* and the bell ringer pipe.

W270-Q—What takes place when the handle is moved to Neutral?
A—Port *10* from the bell ringer pipe is disconnected through the rotary valve and connected to the exhaust port, thus stopping the ringing of the bell.

Equipment Arranged for Multiple Unit Operation

W271-Q—What does standard equipment for multiple unit operation consist of?
A—The basic 6-SL equipment, with a three position brake pipe cut out cock instead of a two position type. An H-6-B Relayair valve unit, a check valve and a 5/16 in. choke for the main reservoir pipe.

W272-Q—What operation is available with this equipment?
A—By operating the independent and automatic brake valves on the lead or controlling unit, the brakes on this unit and a trailing unit can be controlled as on a single locomotive.

W273-Q—What components make up the H-6-B Relayair valve unit?
A—The H-6-B Relayair valve unit (Fig. 35), consists of a pipe bracket which mounts two Relayair valve portions designated as the transfer valve and the cut-off valve. A third mounting face is covered with a blanking pad.

W274-Q—With what operating pressure is the transfer valve provided, and how is it furnished?
A—The transfer valve provides an operating pressure of 25 psi above the diaphragm, furnished by means of a spring arrangement.

Instruction Pamphlet 5046-15 (Page 46)

W275-Q—With what operating pressure is the cut-off valve provided?
A—The cut-off valve's spring arrangement provides 50 psi operating pressure.

W276-Q—How does the transfer valve function?
A—It performs the transfer functions between lead and trailer unit operation, previously found in the transfer valve portion of the 6-DKR distributing valve.

W277-Q—How does the cut-off valve function?
A—It functions to close the connection to the equalizing pipe in case of a break-in-two between units.

W278-Q—How does the break pipe cut-out cock on the brake valve function on this equipment?
A—It controls the usual brake pipe connection to the brake valve and also controls the main reservoir connection to the transfer valve diaphragm chamber.

Operation (Plate 11)

W279-Q—What additional pipes are required on equipment arranged for multiple unit operation?
A—1-Main Reservoir Pipe. 2-Equalizing Pipe. 3-Transfer Valve Operating Pipe.

W280-Q—How does the additional main reservoir pipe function?
A—This pipe couples the air supp.ly from the trailing unit main reservoir and compressor system to that of the lead unit, augmenting supply of air for train braking.

W281-Q—What is the purpose of the equalizing pipe?
A—The equalizing pipe conveys air at brake cylinder pressure from the distributing valve of the lead unit to the distributing valve of the trailing unit.

W282-Q—How does this air pressure control the brake cylinder pressure on the trailing unit?
A—Through the application portion of the distributing valve.

W283-Q—How does the transfer valve operating pipe function?
A—The transfer valve operating pipe connects passage *9* of the brake valve with chamber *D* of the transfer valve portion of the H-6-B Relayair valve unit.

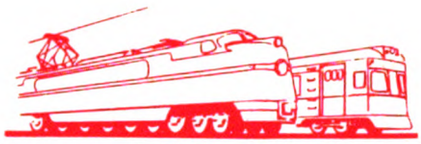
W284-Q—How is remote control of the transfer valve obtained through this pipe?
A—By means of the brake pipe cut-out cock.

W285-Q—What are the air connections with the brake valve cut-out cock on the first locomotive in lea dposition?
A—Chamber *D* above the diaphragm of the transfer portion of the H-6-B Relayair valve unit and the transfer valve operating pipe are vented to the atmosphere.

W286-Q—How does this connection affect the transfer valve portion ?
A—With no air pressure on diaphragm *10* of the transfer valve portion, valve *17* is held off its seat by spring *19.*

W287-Q—What action now takes place in the cut-off valve portion?
A—The main reservoir air on diaphragm *10* of the cut-off valve portion forces it downward, unseating valve *15.*

DIESELS



ELECTRICS

MU CARS

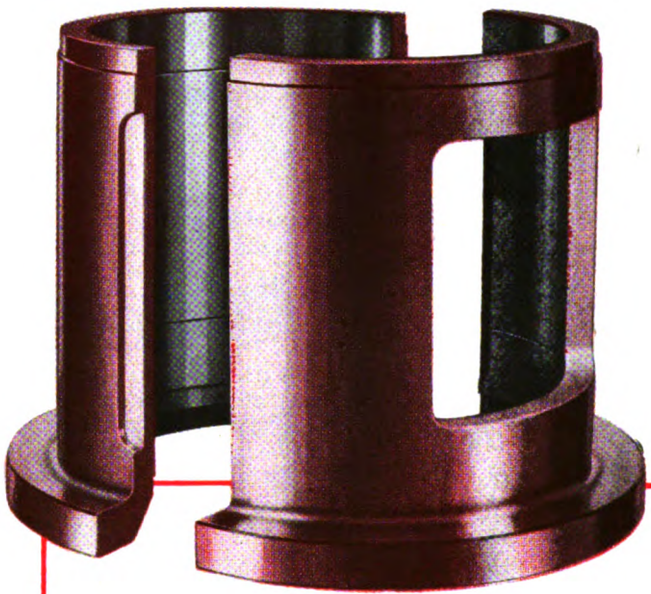
ALL can have EXTRA, TROUBLE-FREE MILEAGE with Magnus traction motor support bearings

EVERY make and model of diesel-electric and electric locomotives or MU cars ever built can take advantage of the extra precision and trouble-free performance of genuine Magnus HIGH MILEAGE traction motor support bearings. These super-precision replacement bearings, designed and built by bearing specialists, can be obtained by any Railroad directly from Magnus Metal Corporation.

Each of the features at the right makes an important contribution to that extra safety factor found only in Magnus traction motor support bearings. And the present-day trend to higher mileage between motor overhauls call for this added cushion against costly breakdowns.

What's more, Magnus high-speed, high-precision production methods can manufacture these bearings so economically that relining or rebuilding is both unnecessary and impractical.

For the complete story on Magnus HIGH-MILEAGE traction motor support bearings, write for your free copy of Bulletin No. 6000, Magnus Metal Corporation, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4, Ill.



FEATURES

1. Perfectly mated bearing halves
2. Heat-resistant Satco lining metal
3. Interchangeable double keeway
4. High strength brass backs
5. Improved flange fillet profile — no "feathering," no "riding."
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WHO'S WHO IN BRUSHES . . .

BIOGRAPHICAL EXCERPTS OF CERTAIN WELL-KNOWN DIESEL-ELECTRIC BRUSH PERSONALITIES YOU MIGHT LIKE TO MEET . . . *and some you wouldn't*

WEAREVER McHARD

Old Wearever has been fighting it out with commutators ever since he was knee high. Fact is, he hates 'em like poison because his pappy taught him long ago that it was either their hides or his'n. Wearever's durability is clearly attested by the fact that he is still living lustily . . . whereas a lot of commutators with which he has been associated have been laid up for extensive hospitalization. Old Wearever is as hard as they come. He's got grit, too. In fact, some folks claim he'd have more friends if he softened up a bit, acquired a little humility and learned to cooperate with commutators instead of battling 'em.

JUSTA SOFTIE

Justa would have a better reputation if she wasn't such a pushover . . . for commutators, that is. No one ever told her that even perfectly well-bred commutators might be quick to take advantage of a weakness like that. Poor Justa! Not very strong to begin with, she tries to be so accommodating that, just when her affairs ought to be whirling smoothly along, she's apt to be plumb worn out. Of course she can be replaced, but some diesel men rightfully complain that this is a lot of unnecessary bother . . . and expensive besides.

THE STACKPOLE BRUSH FAMILY

The word "adaptable" best describes this rather remarkable clan. Take ole Uncle Happy Medium Stackpole, for instance. He's hard but not too hard, soft but not too soft. For years, he's been a kissin' neighbor to a whole flock of commutators. Gets along with 'em smooth as molasses. Quicker'n you can say "no bar-burning," he flips a film on commutator surfaces. What's more, he keeps it there over long mileage schedules and under mighty trying conditions. No need for frequent and costly commutator "reconditioning" when he's on the job. That's why Uncle Happy is honorary president of S.P.C.C. which, in case you've forgotten, is the Society for Prevention of Cruelty to Commutators. Uncle Happy's pretty proud of his achievement. So are we!

STACKPOLE
diesel-electric
BRUSHES

STACKPOLE CARBON COMPANY • *St. Marys, Pa.*

When Amps Go Up . . .

ter voltage by the traction motor is the principal reason for having transition of power controls.

For example on an E.M.D. freight unit there is a heavy ampere demand to get the train started. At 19 miles per hour the generator voltage has risen to about 930 volts, and the amperes will have dropped to about 600 or lower. At that moment more torque output is required of the motors to accelerate train speed. Increased torque demands more amperes.

To provide more amperes we might call on the generator to increase the voltage to pressure more amperes through the motor. But that is not too good as any material voltage increase might spark a flashover through a leakage path.

Field shunting is accomplished by contactors which provide a shunt to by-pass a portion of the applied current around the field coils through a shunting resistor. The resulting weakened field strength reduces the counter voltage, which permits the motor to accept more amperes to increase its torque to accelerate train speed.

When it later becomes necessary for further transition to a parallel motor hook up, the field shunting circuit is cut out and does not again come into use until the No. 4 transition.

Field shunting is normally used for the purpose of increasing traction motor speed.

Transition is desirable on increasing speeds for best train acceleration. On decreasing speeds, such as on a heavy grade, transition is imperative to prevent overloading the main generator.

When the engine on a diesel locomotive is putting out constant horsepower, the generator is putting out constant watts or kilowatts. "Volts times amps is watts" and the power from the generator is passed on to the motors with lots of volts and few amps at high locomotive speeds and relatively few volts and high current values at low speeds. It is necessary to put a limit on both voltge and current, but between these limits, it is always possible to exchange volts for amperes and keep the same power. Transition and field shunting are simply means of keeping current and voltage values within reasonable limits.

Personal Mention

(*Continued from page 18*)

motive inspector, enginehouse foreman, shop foreman and general foreman at various points. Appointed master mechanic, Waterloo, Iowa, in 1951, general superintendent motive power, C&NW, in April 1956.

Clinchfield.—*Erwin, Tenn.:* Title of P. O. LIKENS changed from superintendent of machinery to chief mechanical officer.

Erie.—*Cleveland:* HEINZ P. ZYDOR appointed assistant mechanical engineer. Position of supervisor tools and machinery abolished. PAUL L. GREEN appointed assistant to superintendent of motive power. Position of supervisor of materials and records abolished. *Meadville, Pa.:* MATHEW L. LARKIN appointed engineer of tests and chief chemist. *Jersey City, N. J.:* JACK L. CRAFT appointed road foreman of engines, New York division. *Marion, Ohio:* ROBERT R. MITCHELL appointed road foreman of engines, Kent division. *Salamanca, N. Y.:* ARTHUR G. CLEMENCE appointed road foreman of engines, Allegany-Bradford divisions.

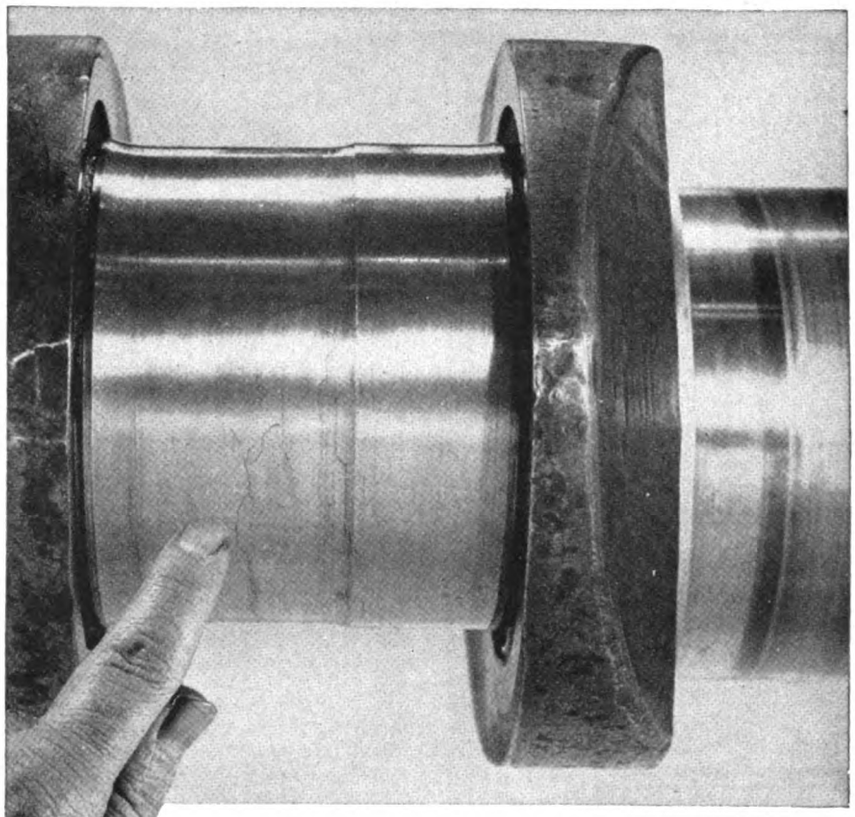
Great Northern.—*St. Paul, Minn.:* JOHN L. ROBSON appointed to newly created position of assistant vice-president, operations. JAMES H. HERON, superintendent of motive power, succeeds Mr. Robson as chief mechanical officer.

Hannibal Connecting.—*Hannibal, Mo.:* E. G. EPPERSON appointed supervisor, motive power and equipment, succeeding to duties of CHARLES HORSTMEYER, retired superintendent equipment.

Louisville & Nashville:—As a result of their recent merger, former employees mechanical of the Nashville, Chattanooga & St. Louis have become associated with the L&N as follows: *Louisville, Ky.:* D. A. REAVIS, assistant superintendent of equipment; W. A. GAINES, assistant electrical supervisor; WINDSOR STONE, assistant engineer of tests, and E. J. MOSER, JR., analyst.

New York Central.—*Buffalo:* RICHARD F. BORSOS, diesel locomotive inspector, appointed division supervisor air brakes and steam heat, motive power. *West Springfield, Mass.:* JOHN F. MIZZI appointed general foreman, car department. Formerly special engineer at New York. *Stanley, Ohio:* WENDELL B. FISCUS, special inspector. appointed division supervisor air brakes and steam heat, diesel shop.

Norfolk & Western.—*Bluefield, W. Va.:* W. F. OLIVER appointed assistant car car foreman. *Lamberts Point, Va.:* W. I. STULTZ appointed assistant car foreman, succeeding Mr. Oliver. *Williamson, W. Va.:* R. L. LENOIR appointed assistant car foreman, succeeding Mr. Stultz. *Shaffers Crossing, Va.:* J. W. BECKNER, gang leader, appointed gang foreman, succeeding Mr. LeNoir.

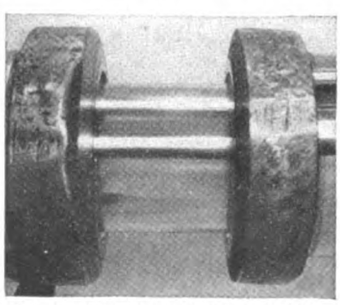


THIS CRANKSHAFT JOB NEEDS A SPECIALIST

This is specialized work, rebuilding crankshafts—intricate, exacting, and naturally expensive. It's the kind of work that demands a specialist . . . and we are just that!

We've specialized in rebuilding crankshafts, because since 1916 we've *made* crankshafts. And who knows better than a maker what are the "musts" of a sound, economical repair job. We'll take your worn crankshaft and rebuild it, if salvagable, through the carefully controlled steps of grit blasting, replating, regrinding and thorough inspection. And we'll deliver it back with a guarantee for 100% performance that only a manufacturer-specialist can provide. May we quote on your next job?

For more details on crankshaft repair write for Bulletin RC-1



This is a finished, repaired crankshaft, after processing by National Forge.

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Irvine (Warren County), Pa.

FRAHM® and JAGABI®
Speed Measuring Instruments
. . . to meet every requirement
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BE SURE YOU'RE ON THE RIGHT TRACK
ALWAYS SPECIFY

MEGGER®
Electrical Resistance
Measuring Instruments
. . . for all electric, Diesel-electric locomotives and other electrical equipment testing requirements.
Write for File RR #1

L. E. Gingerich

E. C. Hanly

Pennsylvania.—*Philadelphia:* L. E. GINGERICH appointed chief mechanical officer, succeeding HOWELL T. COVER, assistant vice-president-chief mechanical officer, who is on leave of absence. HANS H. HAUPT appointed assistant to the chief mechanical officer. HARRY M. WOOD appointed superintendent, equipment, Philadelphia Region, succeeding Mr. Haupt. EDWIN C. HANLY, superintendent, equipment, Northern Region. Buffalo, succeeds Mr. Wood as assistant chief mechanical officer-car.

Richmond, Fredericksburg & Potomac.—*Acca Terminal, Richmond, Va.:* J. A. W. SMITH, assistant master mechanic, Potomac Yard, appointed general foreman locomotive department. R. G. SELFE, diesel supervisor, appointed assistant general foreman locomotive department.

Southern.—*Sheffield, Ala.:* PRINCE B. ELEAZER, JR., appointed general foreman. Formerly general foreman at Atlanta, Ga. *Memphis, Tenn.:* HUGH L. SELLERS appointed enginehouse foreman.

Southern Pacific.—CHARLES O. KRAMER appointed assistant electrical engineer.

Obituary

Easley B. Bailey, assistant car foreman, Norfolk & Western at Bluefield, W. Va., died October 9.

Supply Trade Notes

NATIONAL ALUMINATE CORPORATION.—National Aluminate has recently completed a five-story addition which more than doubles its administrative and laboratory facilities at Chicago.

■

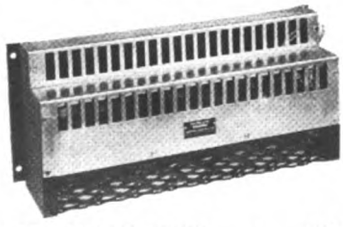
WAUKESHA MOTOR COMPANY.—Waukesha has purchased the complete plant and assets of the *Climax Engine Manufacturing Company* of Clinton, Iowa, manufacturers of internal combustion engines.

(*Continued on page 66*)

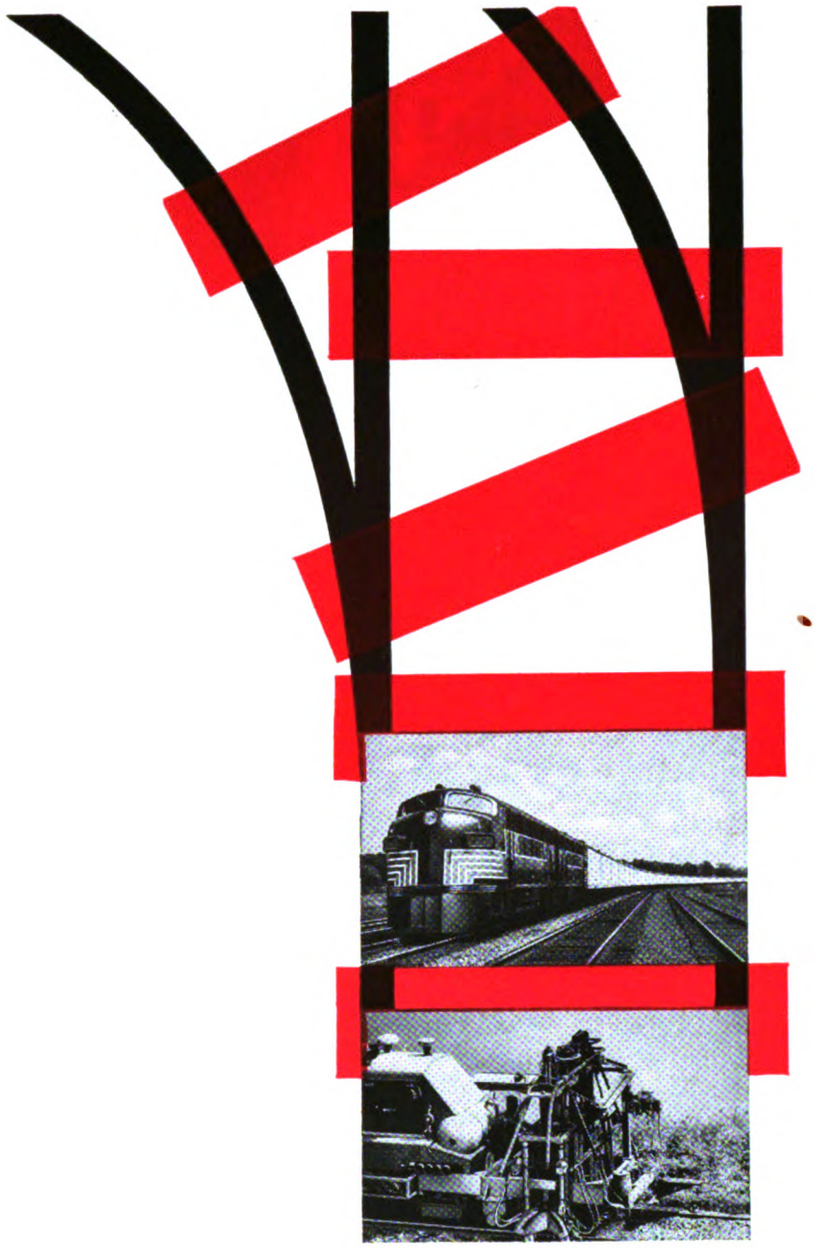
IT WARMS THE MAN FIRST

Thermal circulation assures low velocity and keeps heated air around the men in the cab.
Both radiant and draftless warm air heat contribute to keeping the crew warm.
Use of electric power from auxiliary generator eliminates water piping—and the possibility of leaks.
Full heat is obtained in below zero weather—independent of engine water temperature.
No moving parts—Low first cost—Low maintenance.
Write for information on how various railroads reduced their operating costs and improved their cab heating.

CONVECTAIR
ELECTRIC HEATER
FOR
LOCOMOTIVE CABS



OGONTZ CONTROLS COMPANY
8029 YORK ROAD • ELKINS PARK • PHILADELPHIA 17, PA.



HAULING A LOAD...REPAIRING THE ROAD

ESSO DIOL RD 77—Specifically developed for the heavy-duty engines of modern locomotives, Esso Diol RD 77 assures peak efficiency and long, trouble-free engine performance—high standards that mean extra lubrication economy.

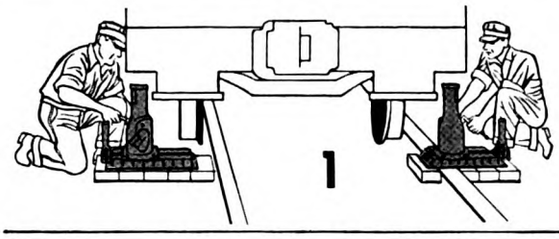
ESSOLUBE HD—For smaller, high-speed diesel engines in maintenance-of-way equipment, Essolube HD detergent-type motor oil provides dependable engine protection . . . cuts oil consumption with long-lasting lubrication.

Skilled Esso technicians are ready to analyze your petroleum needs and recommend the best fuel or lubricant for your diesel equipment. For information or technical assistance, call your local Esso office, or write: Esso Standard Oil Company, Railroad Division, 15 W. 51st Street, New York 19, N. Y.

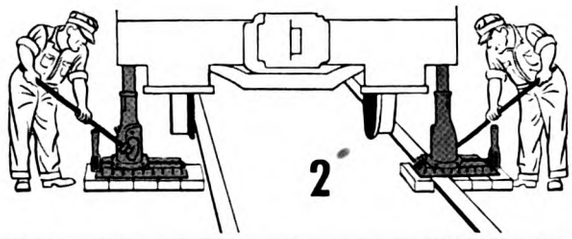
Esso RAILROAD PRODUCTS

How to get back on the track quickly

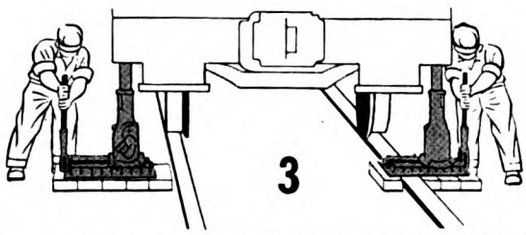
Without A Crane!



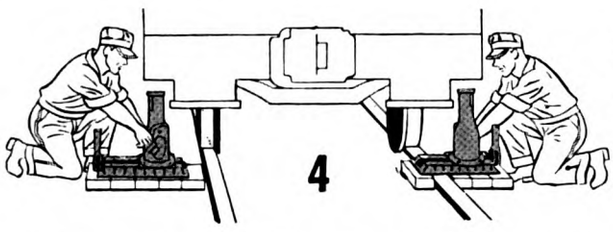
Place a *Duff-Norton traversing base* and *jack* beside each derailed truck.



Jack up the car or locomotive until wheels clear top of rails.

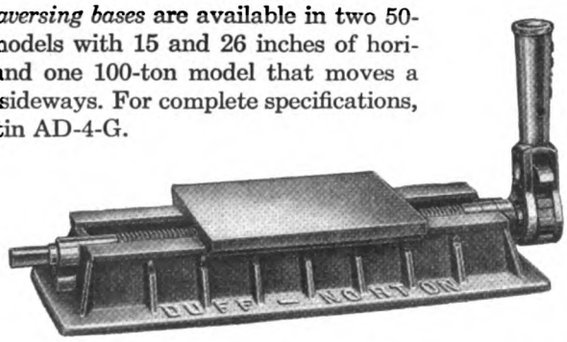


Move jacks horizontally simultaneously on traversing bases until wheels are in alignment with rails.



Lower wheels; you are back on the track, quickly, inexpensively and without danger of distorting car or locomotive frame.

Duff-Norton traversing bases are available in two 50-ton capacity models with 15 and 26 inches of horizontal travel and one 100-ton model that moves a load 20 inches sideways. For complete specifications, write for bulletin AD-4-G.



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DUFF-NORTON JACKS
Ratchet, Screw,
Hydraulic, Worm Gear

DUFF-NORTON

COFFING HOISTS
Ratchet Lever
Spur Gear, Electric

Supply Trade Notes

(*Continued from page 64*)

K. G. Douglas

V. J. Boudreau

J. J. Sieber

C. T. Janik

ELDORADO MANUFACTURING CORPORATION.—*Kenneth G. Douglas* has been named president, and *Vernon J. Boudreau,* vice-president-sales, of the newly formed Eldorado Manufacturing Corporation at Eldorado, Ill., which is doing a variety of reclamation work, including power assembly units, for railroads. Mr. Douglas was formerly sales manager for the Parts Processing Corporation, Battle Creek, Mich., and superintendent of the Eaton Manufacturing Company. Mr. Boudreau was manufacturers representative for the Parts Processing Corporation.

■

BRODERICK & BASCOM ROPE CO.—*J. J. Sieber* has been elected vice-president in charge of sales. *K. B. Britt* succeeds Mr. Sieber as sales manager.

■

KYSOR HEATER COMPANY.—CLARENCE T. JANIK, sales manager, has been named vice-president.

■

MET-L-WOOD CORPORATION.—*D. O. Williamson* has been appointed sales manager at Chicago.

■

WESTINGHOUSE AIR BRAKE COMPANY, AIR BRAKE DIVISION.—*S. L. Poorman,* vice-president, sales, has retired.

■

LEWIS BOLT & NUT CO.—*E. T. Brown* has been appointed vice-president.

■

DUFF-NORTON COMPANY.—*Robert J. Beck* has been appointed assistant chief engineer, Jack division. Mr. Beck was formerly with the Atomic Power Division of the Westinghouse Electric Corporation.

E. W. Ahlstrom

W. W. Gould

W. J. McGraw

THOMAS A. EDISON INDUSTRIES, EDISON STORAGE BATTERY DIVISION.—*Robert H. Weeks, Jr.*, has been appointed assistant division manager at West Orange, N. J.; *James A. Mustard, Jr.*, general sales manager at West Orange; *William W. Gould*, Chicago district manager, and *Elmer W. Ahlstrom*, Cleveland district manager. Mr. Weeks was previously general sales manager; Mr. Mustard, regional sales manager, Chicago and St. Louis districts; Mr. Gould, Cleveland district manager, and Mr. Ahlstrom, field engineer at Cleveland.

■

THOR POWER TOOL COMPANY.—*William J. McGraw* has been appointed general sales manager, and *Clarence B. Bergren*, manager of Thor electric and SpeedTool sales, both with headquarters at Aurora, Ill. Mr. McGraw was previously electric tool sales manager, and Mr. Bergren, Milwaukee branch manager.

■

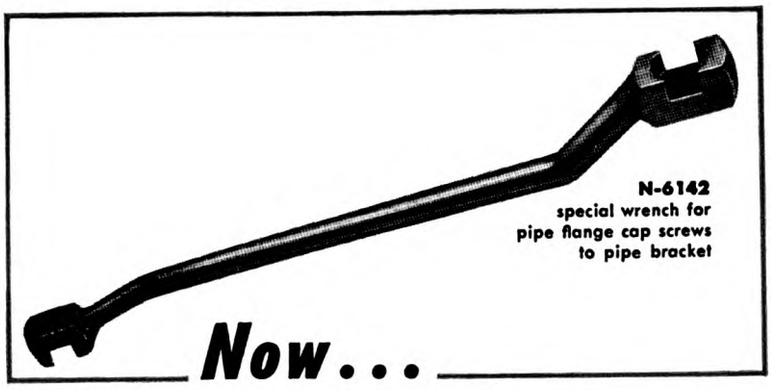
GOULD-NATIONAL BATTERIES, INC.—*C. W. Hanna* has been appointed Chicago regional manager of the Industrial Division.

■

DEVILBISS COMPANY.—*D. L. Bohon* has been transferred from Los Angeles to the home office sales department in Toledo, Ohio. *George W. Fulton* succeeds Mr. Bohon as West Coast regional sales manager.

■

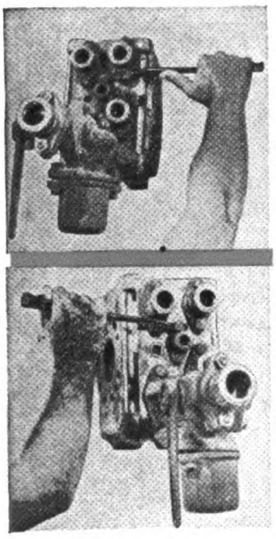
K. W. BATTERY COMPANY.—*Ward Dickover* has been appointed vice-president in charge of operations. He was formerly chief engineer, Industrial Division of Gould National Batteries, Inc., and more recently consultant and director of the battery laboratory at the National Bureau of Standards, Washington, D. C. *Edward J. Campbell* has been appointed sales engineer in the Minnesota-Iowa area. He was previously



N-6142
special wrench for
pipe flange cap screws
to pipe bracket

Now...

REACH · GRIP · TURN
pipe flange cap screws
FAST · SAFE · EASILY
with this *Snap-on* Wrench



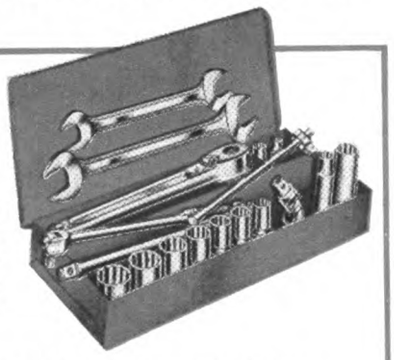
Here's a new, special *Snap-on* tool made to work where the closeness of cap screws to the sides of pipe flanges makes it almost impossible to use an ordinary wrench.

Built slim, the N-6142 wrench fits into these tight spots to turn the least accessible of the pipe flange cap screws. Snug and firm-fitting, it adds speed and safety to an otherwise time-taking, awkward job whether attaching or removing the pipe connections.

Wrench openings are 9/16-in. and 3/4-in. with the sides cut away to permit swinging the wrench enough to get a new hold on the cap screw. The double-broached openings will take a new "bite" with only a 30-degree turn.

***Snap-on* AB Brake Maintenance Kit**

All the tools needed to dismantle and assemble brake cylinders or remove and apply AB valves and triple valves. Use the *Snap-on* AB kit for brake work efficiency that only these specially selected tools provide.



Check on many other special *Snap-on* railroad tools and kits that keep costs down, rolling stock "on the move." Write for the *Snap-on* railroad division catalog of special and standard tools.

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SNAP-ON TOOLS CORPORATION

8130-A 28th Avenue • Kenosha, Wisconsin

sales representative for the Clark Equipment Company.

Obituary

CHARLES R. ELLICOTT, retired vice-president of the Westinghouse Air Brake Company, died on November 24 in Glen Ridge, N. J.

What's New

(*Continued from page 10*)

top capacity is 300 cfm. No special tools are needed for assembly or disassembly. *Sales Promotion Department, Le Roi Division, Westinghouse Air Brake Co., Dept. RLC, Milwaukee 1.*

Electric Lantern

The steel and aluminum lantern illustrated, designed for railroad service, has a heat-treated aluminum bail with heavy Neoprene coating. This provides a firm grip, and resistance to oil. The bail stays in position, yet may be moved readily on a permanently fixed rivet attachment tested for 15,000 operations without losing original tension.

For permanent brightness, the reflector is of stainless steel. At the flip of a switch, it throws a broad, strong signal, or a spot for reading car numbers. A clip in the cap holds two spare bulbs. *Adams & Westlake Co., Dept RLC, Elkhart, Ind.*

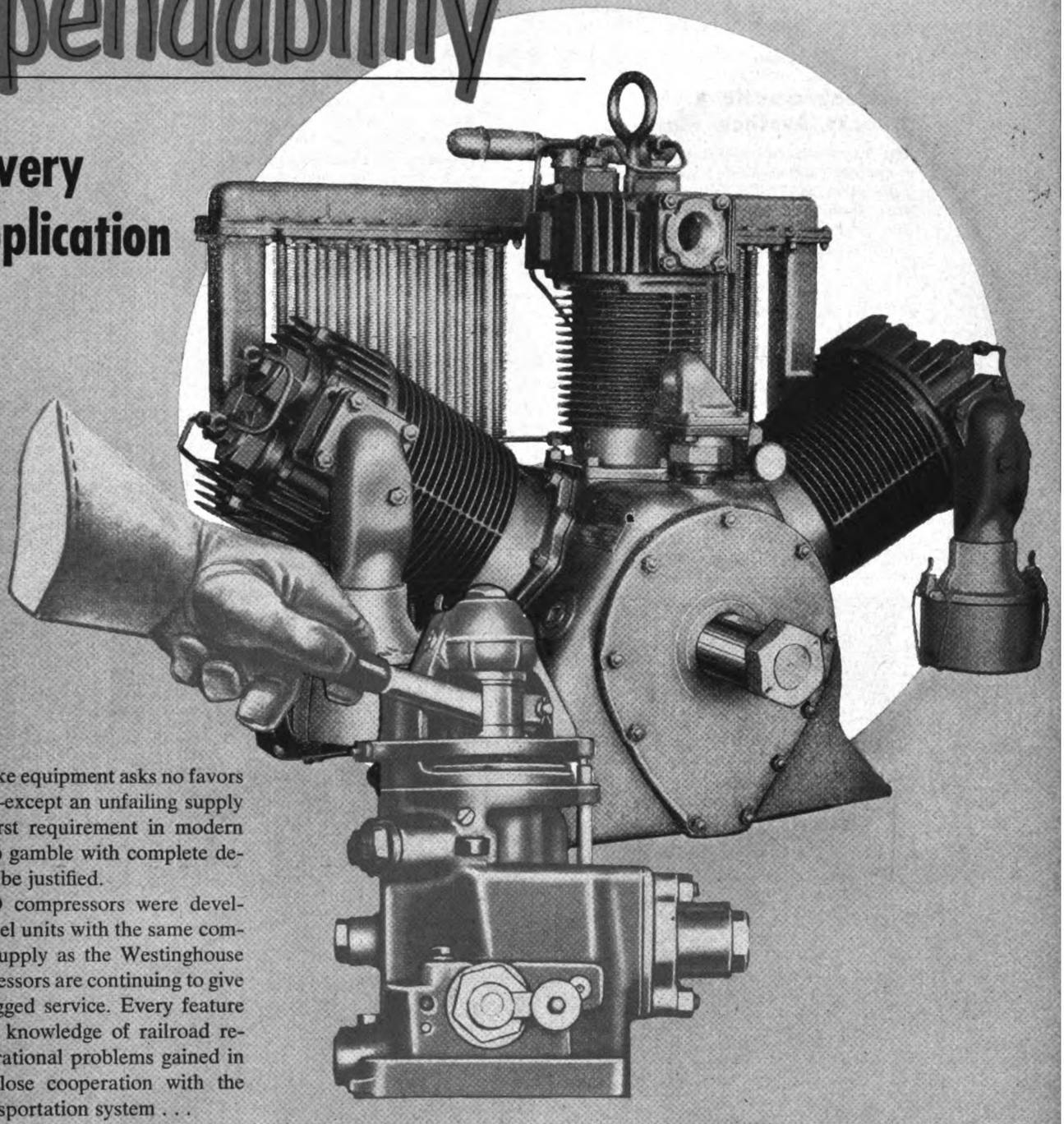
Plastic Cable Wrapping

Amp-Spirap is a spirally-cut plastic wrapping that eliminates tedious cable lacing, insulation damage, and pulling of wires through spaghetti tubing. It is quickly applied to wire bundles of any

(*Continued on page 70*)

WESTINGHOUSE CD COMPRESSORS

put dependability behind every brake application



Westinghouse Brake equipment asks no favors on any assignment—except an unfailing supply of air. That's the first requirement in modern train control, and no gamble with complete dependability can ever be justified.

Westinghouse CD compressors were developed to provide Diesel units with the same completely reliable air supply as the Westinghouse Steam Driven compressors are continuing to give through years of rugged service. Every feature reflects the intimate knowledge of railroad requirements and operational problems gained in over 80 years of close cooperation with the nation's leading transportation system . . .

- Radiator-type intercooler between high pressure and low pressure cylinders reduces temperature of discharge air and increases efficiency.
- Full-pressure type lubrication system maintains even, constant flow of filtered oil to connecting rod crankshaft bearings and wrist-pin bearings.
- Throw-off of oil from connecting rod bearings lubricates cylinder wall and also main crankshaft ball bearings.

Westinghouse Air Brake
COMPANY
AIR BRAKE DIVISION WILMERDING, PA.

size up to 3½ in. diameter and permits individual wires to be entered or led out at any point. It may be unwound to allow wires to be added, removed, or relocated, eliminating the need to cut into the cable bundle after assembly. It holds wires together tightly, but permits flexibility for forming cable and provides mechanical protection over the entire length of cable. *Amp Incorporated, Dept. RLC, Harrisburg 19, Pa.*

Monochromatic Light Checks Surface Flatness

The Lapmaster monochromatic light is a compact self-contained unit of heavy gage sheet steel with a baked metallic gray finish. The unit is (4) times larger than previous models. The light is 11 in. by 14-in. with a work stage size of 10 in. sq.

A heavy duty 9,000-volt transformer provides an average of 40 foot candle power at the diffusing glass. Its light head may be tilted back and adjusted for height to permit maximum light on the check area. On pieces too large for the work stage to hold, the light head may be swung completely around to permit checking of work on a bench. Using Lapmaster Optical Flats, the unit is said to offer the most accurate method of checking and inspecting surface flatness on lapped parts of any size. *Crane Packing Company, Dept. RLC, 6400 Oakton st., Morton Grove, Ill.*

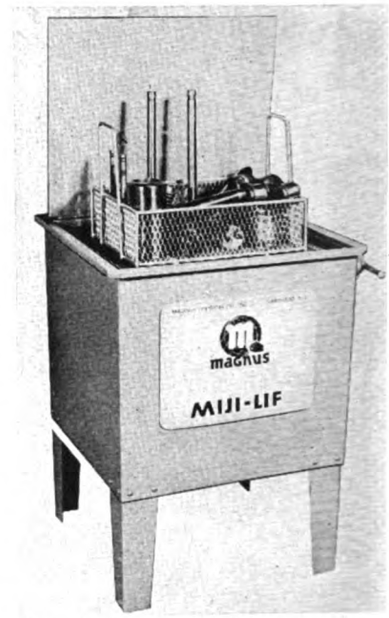
Angle Attachments

These angle attachments were developed for use with the recently developed line of Keller air drivers, angle screw drivers and nut setters. To simplfy production fastening in close quarters and hard-to-reach places. The manufacturer's No 2 air motors power both the 12G-2 series screw drivers and the 16G-2 series nut setters and are said to provide more speed, increased power, low noise level and low maintenance. *Gardner-Denver Company, Dept RLC, Quincy, Ill.*

Agitator Cleaner

The Miji Lif has been designed for the cleaning of small parts such as maintenance right-of-way equipment, signals, air brakes, injectors, and governors, etc. Batches of parts up to 75 lb can be cleaned in the unit.

Operation of the cleaner is by compressed air. A flick of the unit's operating lever brings the platform to the top of the tank, out of the liquid for inspection, loading and unloading the work. A second flick of the lever lowers the platform to the bottom of the tank where the work is automatically agitated up and down in the solution, shearing the dirt from the parts.



The cleaning units are available in heated and unheated models. The 30 gallon size has a working platform of 21 x 18 in. *Equipment Div., Magnus Chemical Co., Dept. RLC, Garwood, N. J.*

How Metallizing saves money in railroad shops

"Cold" metal build-up helps beat skyrocketing replacement costs—speeds maintenance jobs

Typical Railroad Metallizing Applications

Engine crankshafts, mains, throws, fits • Engine cylinders, liners, liner flutes • Water jackets, camshaft bearings • Generator, traction motor, other armature shaft bearing fits • Compressor crankshafts • Traction motor end housings • Pump rods and shafts • Eroded or corroded portions of engine blocks • Car lighting generator pulleys • Dents and scatches in car bodies

—practically any worn part repaired at only 15 to 20% replacement cost—get equipment back in service in hours, instead of days or weeks.

Some of the 28 major railroads using Metallizing:

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New York Central	Northern Pacific	Canadian National
Atlantic Coast Line	Pennsylvania	Chesapeake & Ohio

SPECIAL RAILROAD BULLETIN AVAILABLE—Illustrates and describes a number of these time-saving, money-saving metallizing applications. Data supplied by railroads using metallizing; photographs taken in user shops. Write for copy.

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METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

DIESEL-ELECTRICS —HOW TO KEEP 'EM ROLLING

This important book explains the electrical fundamentals of all makes, all types of diesel-electric locomotives in plain, non-technical language easily understood by any practical shop or maintenance man.

The 24 chapters are the work of eleven specialists and are edited by A. G. Oehler, electrical editor of *Railway Locomotives and Cars*, where they appeared over a stretch of more than two years. This is the first time the entire series has been assembled in one book, complete with full illustrations, both diagrams and photographs.

It is a valuable source of electrical knowledge that will be found useful to anyone in railroad service who has to do with diesel-electric locomotives.

CONTENTS:

Fundamentals Helpful in Maintaining Electrical Equipment. Troubles Do not Happen—They Are Caused. Lubrication of Roller Bearings and Gears. Running Maintenance of Commutators. Brushes and Brush Rigging. Insulation, Its Purpose and Requirements. Inspection and Tests—Motor and Suspension Bearings; Two Anti-Friction Bearings; Gears and Pinions; Electrical Parts. The Locomotives Excitation System—(1) Function and (2) Details of Operation Contactors and Relays. Power Switches, Reversers, Control Switches, Controllers, Breakers, and Fuses. Static Control Devices. Some Simple Battery Circuits. Diesel Engine Governor. Engine Control. Batteries and Battery Charging. Control for Battery Charging. Dynamic Braking. Transition. Trouble Shooting. ABC of Flashovers.

1954 139 pages 217 illus. 8½ x 11. Paper. $2.50

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New York 7, N. Y.

Please send a copy of DIESEL-ELECTRICS—How to Keep 'Em Rolling for which I enclose $2.50.

Name_____

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City, Zone, State_____

we invite you to *compare* the *new*, improved Adlake electric lantern

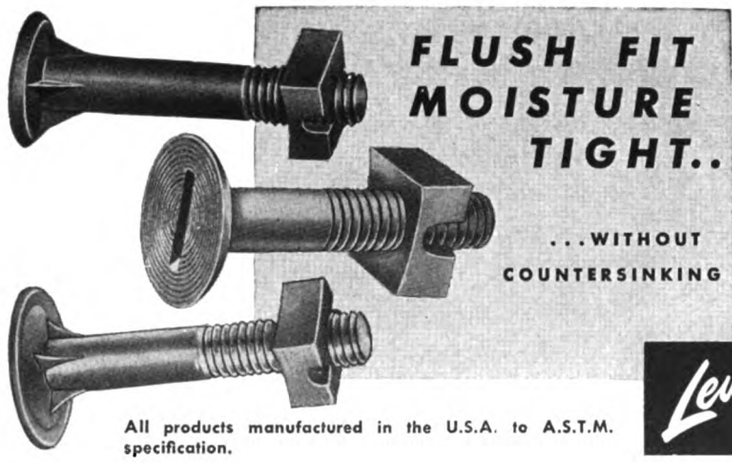
We invite you to make your own comparison, and when you have tried this lantern we believe you will agree that it is the finest available.

Railroading itself dictated the improvements which are combined in this new, lighter weight Adlake electric lantern. Think of these benefits in terms of the men who use lanterns:

- **Stainless steel reflector—stays bright.**
- **At a flip of the switch the lantern throws either a strong signal or a brilliant spot for reading car numbers.**
- **Extruded aluminum bail, heat treated, with heavy coat of neoprene—a firm grip, resists oil, has ample arm clearance.**
- **Bail stays in position, but moves readily on new rivet attachment—tested for 15,000 operations without losing original tension.**
- **Holder in cap for two spare bulbs.**

Write the Adams & Westlake Company, 1152 Michigan, Elkhart, Ind.

The Adams & Westlake Company
Established 1857 • Elkhart, Indiana • New York • Chicago



Lewis sealtite car bolts

Each Lewis Sealtite car bolt has special "wood engineering" beveled head for flush, moisture tight, fit . . . without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning . . . slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

All products manufactured in the U.S.A. to A.S.T.M. specification.

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504 Malcolm Ave. S. E.
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—ADVERTISERS IN THIS ISSUE—

Adams & Westlake Company, The ... 71
Albertson & Co., Inc. ... 7
American Brake Shoe Company, Railroad Products Division ... 52, 53
American Steel Foundries ... 14, 15

Bethlehem Steel Company ... 59
Biddle Co., James G. ... 64
Buckeye Steel Castings Co., The ... 21

Dana Corporation ... 48
Dayton Rubber Mfg. Company ... 12, 13
Duff-Norton Company ... 66

Elastic Stop Nut Corporation of America ... 43
Electro-Motive Division, General Motors ... 38, 39
Esso Standard Oil Company ... 65

General Steel Castings Company ... 19
Griffin Wheel Company ... 54, 55

Journal Box Servicing Corporation ... 11
Joy Manufacturing Company ... 41

Lewis Bolt & Nut Company ... 72
Linde Company, a Division of Union Carbide Corporation ... 8, 9

Magnus Metal Corporation ... 22, 61
Metallizing Engineering Co., Inc. ... 70
Miller Lubricator Co. ... 51
Miner, Inc., W. H. ... 3

National Carbon Company, Division of Union Carbide Corporation ... 45
National Forge & Ordnance Co. ... 63
National Malleable & Steel Castings Company ... 46, 47

Oakite Products, Inc. ... 17
Ogontz Controls Co. ... 64

Pullman-Standard Car Manufacturing Company ... 4

Security Railway Products Co. ... 44
Snap-on Tools Corporation ... 68
Stackpole Carbon Company ... 62
Standard Car Truck Company ... 6, 57
Standard Railway Equipment Manufacturing Company ... 20
Stratoflex, Inc. ... 67

Texas Company, The ... Inside Front Cover
Timken Roller Bearing Company, The ... Back Cover
Toledo Pipe Threading Machine Co., The ... 51

Union Carbide Corporation, Linde Company Division ... 8, 9
Union Carbide Corporation, National Carbon Co. Div. ... 45
United States Graphite Company ... Inside Back Cover

Westinghouse Air Brake Company ... 69
Wine Railway Appliance Co., The ... 35

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LOW COMMUTATOR MAINTENANCE

Because of their long life and reduction of copper drag which minimizes flashovers, USG Brushes AY 32 and 2306 have proven convincingly that they reduce the maintenance cost on Diesel-Electric locomotive generators.

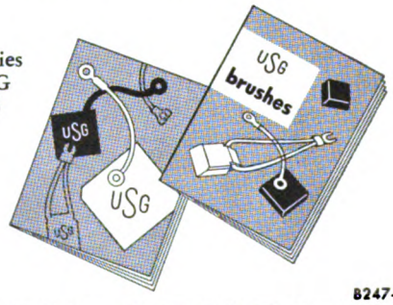
LONGER LIFE—MINIMUM WEAR

Primarily because of their purity and density, USG Brushes operate perfectly for substantially longer periods of time than the average type brush. Naturally, this means reduction in delays due to brush replacement.

PERMANENT SHUNT CONNECTION

In recent years nearly every reputable brush manufacturer has improved the anchorage of the shunt connections: none, however, are quite as firm or quite as permanent as the method employed on USG Brushes, called STATITE®. The shunt can't be jerked out and, of course, it does not jar loose.

Write for your copies of the latest USG Brush Catalog B-56 and the new USG Brush Grade Supplement.



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THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION, SAGINAW 13, MICHIGAN

GRAPHITAR® CARBON-GRAPHITE • GRAMIX® SINTERED METAL PARTS • MEXICAN® GRAPHITE PRODUCTS • USG® BRUSHES

What % of "Roller Freight" cars are in Interchange today?

CHECK ONE

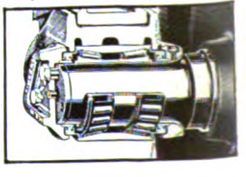
- ☐ LESS THAN 20%
- ☐ 30%
- ☐ OVER 50%

YOU may be surprised to hear that more than 13,000 "Roller Freight" cars are in interchange. That's more than 50% of all the Timken® tapered roller bearing equipped cars now in service or on order. And the percentage of cars in interchange is climbing.

The interchange system made our railroads great. Now "Roller Freight" in interchange will make them even greater. Because it's the only sure cure for the hot box problem. And Timken bearings cut terminal bearing inspection time 90%, reduce lubricant costs as much as 95%. On the road and through terminals, shipments move faster and more economically via "Roller Freight".

In their battle for business, more and more railroads are turning to Timken bearing equipped cars. Already, forty railroads and other car owners have put "Roller Freight" into interchange. When all freight moves by "Roller Freight", America's railroads will cut costs tremendously, earn an average return of about 22% on their "Roller Freight" investment. For the full story, send for your free copy of "How America's Railroads Can Save $224,000,000 Annually". Write The Timken Roller Bearing Company, Canton 6, Ohio.

Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD

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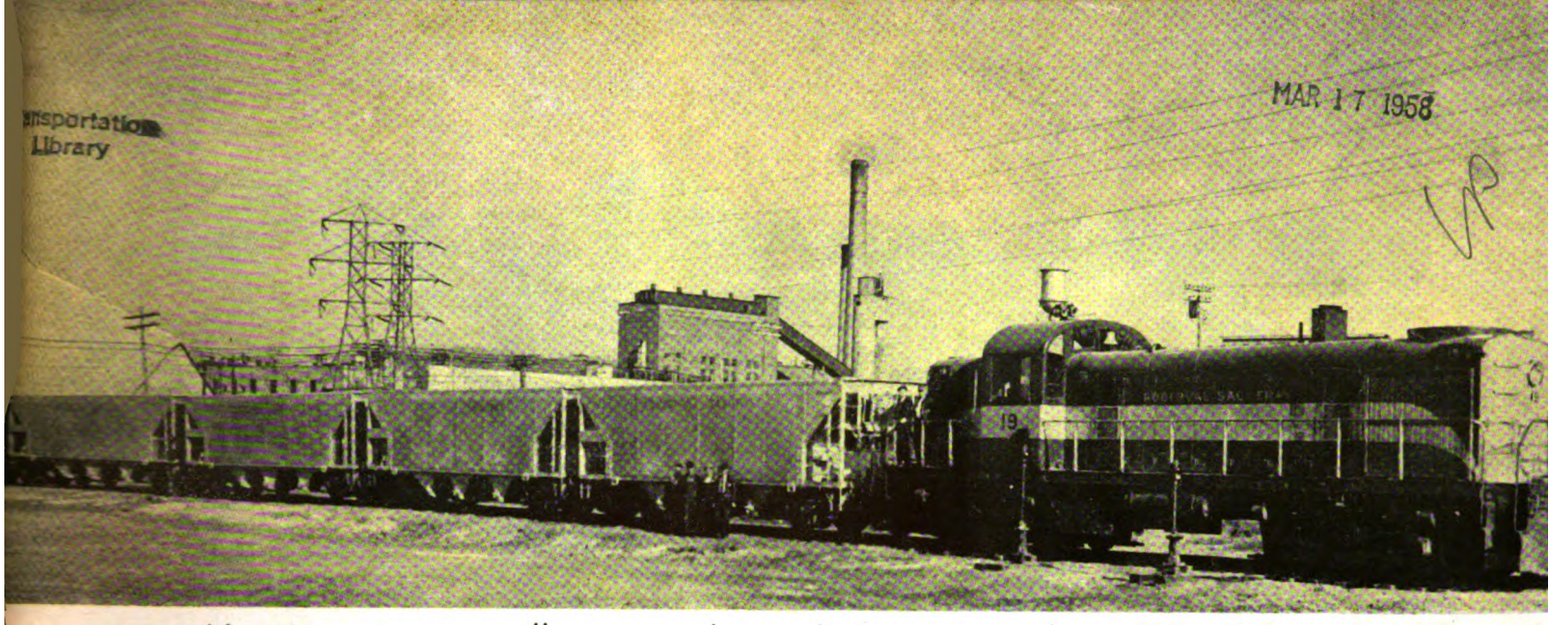


Aluminum center sills prove themselves in Canada... Page 25

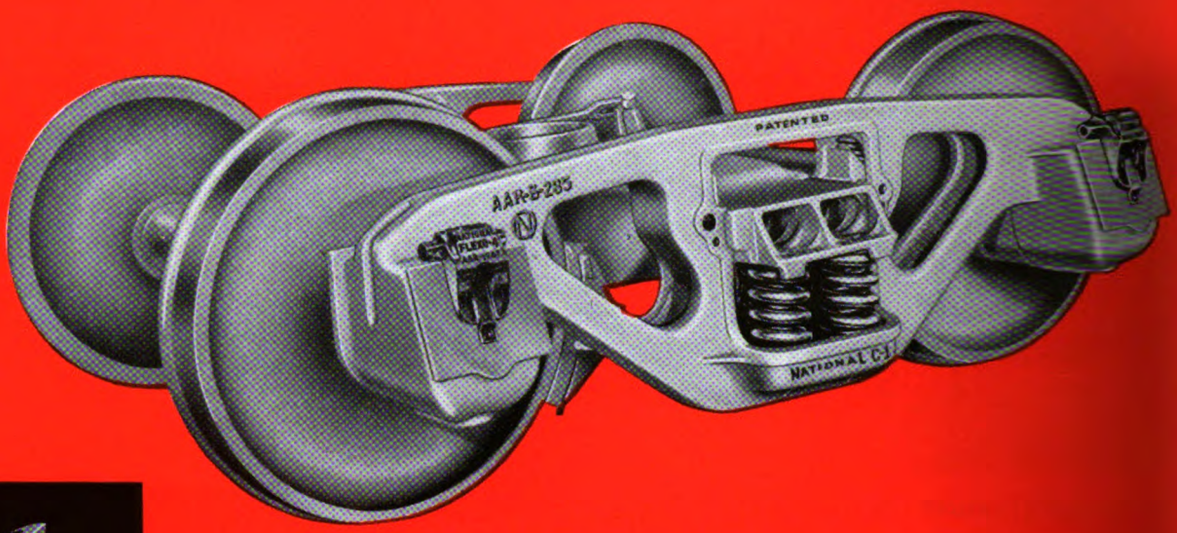
RAILWAY LOCOMOTIVES AND CARS

A SIMMONS-BOARDMAN TIME-SAVER PUBLICATION FEBRUARY 1958

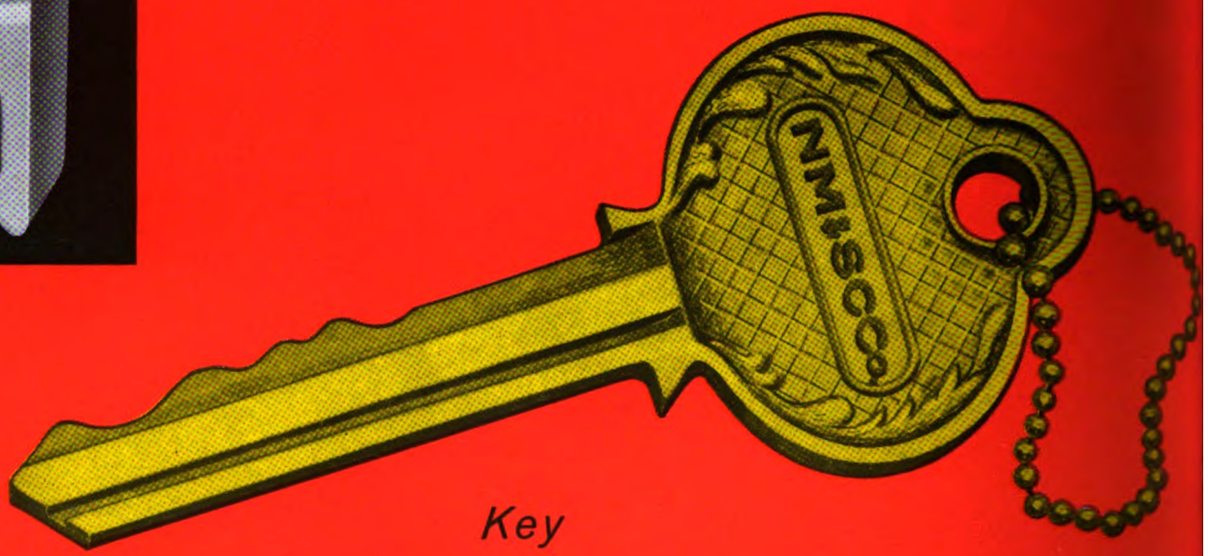
Reclamation: How Missouri Pacific does cylinder heads... Page 34

MAR 13 58
TRANSPORTATION

FOUNDED 1832
AMERICA'S OLDEST TRADE PAPER



THE WEDGE



Key

to lower maintenance in

NATIONAL C-1 TRUCKS

In National C-1 Trucks, longer wedge life results from design of the friction mechanism itself, and the special analysis materials of which the wedge and wear plate are made.

Actual service records on leading railroads prove that National C-1 Truck Wedges are still in prime condition—even after traveling the equivalent of 8 times around the world.

NATIONAL
SPECIALTIES

COUPLERS
YOKES
DRAFT GEARS
FREIGHT TRUCKS
JOURNAL BOXES

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

Established 1868

GEARED TO PROGRESS
P R I
MEMBER

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Cleveland 6, Ohio

International Division **Headquarters**
Cleveland 6, Ohio

CANADIAN SUBSIDIARY
National Malleable and Steel Castings Company of Canada, Ltd.
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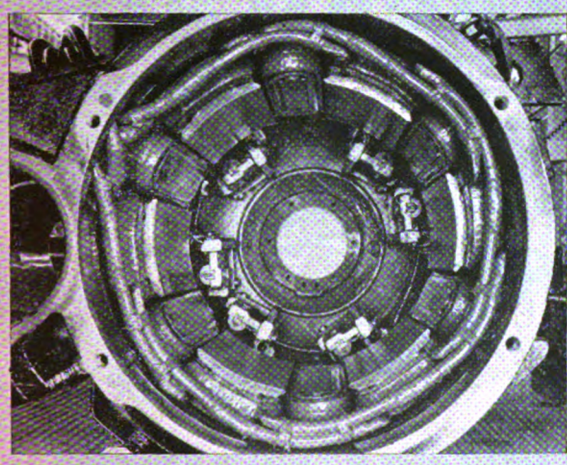
AA-6 AA-6382

Here's why NATIONAL Plastic Molded COPPER-CLAD Field Coils

Insure Longer Service Life



The main illustration shows a plastic molded, copper-clad interpole field coil for a railway traction motor. The small photo shows a set of such coils assembled with main field coils of the same construction in a traction motor frame. For details on how National plastic molded, copper-clad field coils can help reduce your motor maintenance problems, just drop us a line or call your nearby National field engineer.

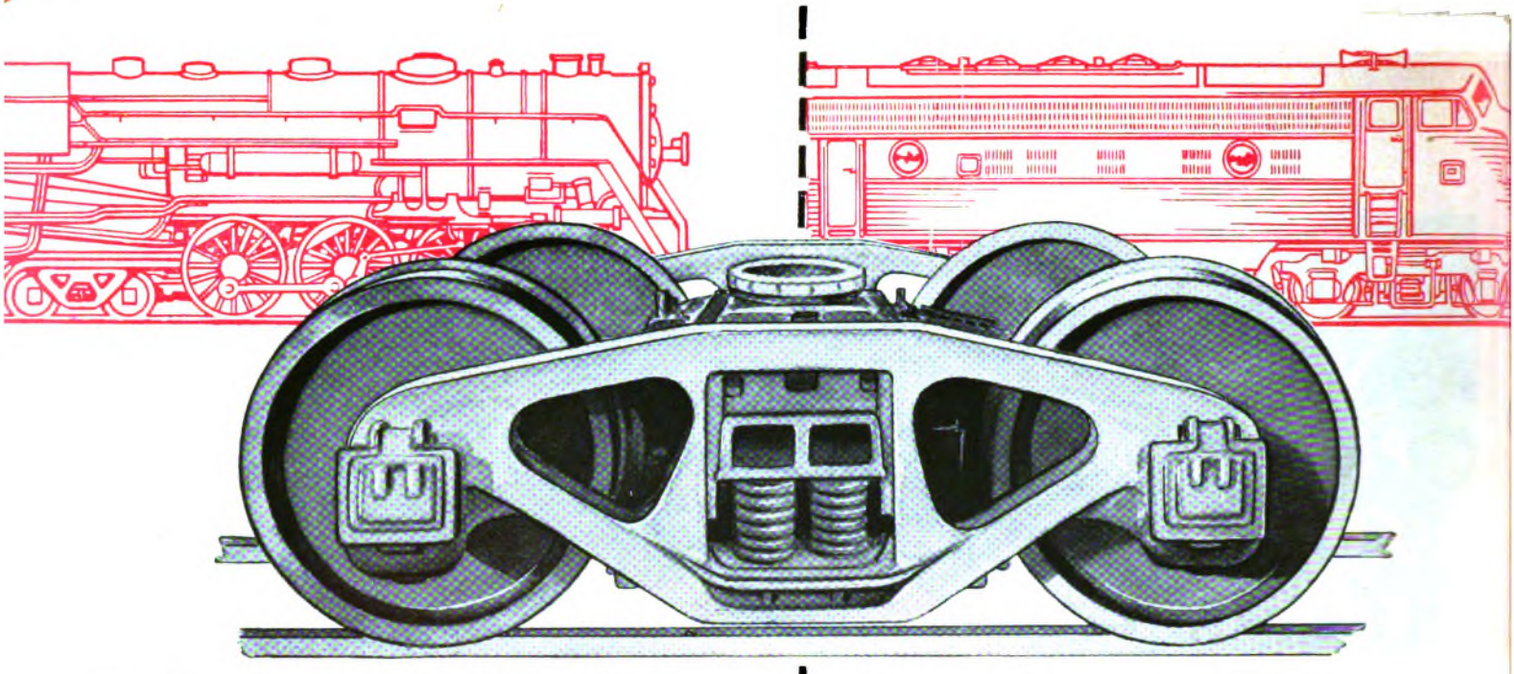
1. Snug fit on pole piece eliminates coil movement and provides maximum heat transfer to the frame.
2. Monolithic construction resists damage from mechanical stresses and insures maximum heat dissipation.
3. Void-free insulation prevents penetration of oil, moisture and other deteriorating agents.
4. Proven heat-resistant impregnant imparts high temperature endurance.

NATIONAL ELECTRIC COIL COMPANY

COLUMBUS 16, OHIO, U. S. A.

TRADE MARK

ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION—
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES



The Old and the New.

. . . from waste to JBS

A Great Step Forward!

With waste gradually being discontinued in journal lubrication, the change-over to a better type of lubricator raises certain questions: what type should it be; what qualities should it possess; what kind of a performance should be expected of it? To help you decide, consider what the JBS Acme Lubricator offers and compare it with any other lubricator. JBS Acme alone has the exclusive all-wool quilted core* which retains many times its own weight in oil reserve. Heavy chenille loop pile surfaces assure an ample supply of filtered oil at all times. JBS Acme Lubricators are unaffected by temperature changes and wick AAR specification car oil even at 45° below zero in road service tests. JBS Acme Lubricators require no modification of the standard journal box, are designed to hold their position in the box, and assure better performance with less servicing.

Write Today for Detailed Information and Folder

ACME JOURNAL LUBRICATORS

- ★ Retains oil up to 4 times its own weight
- ★ Requires no modification of journal box
- ★ Wicks AAR specification car oil even in coldest weat
- ★ Assures better performance with less servicing
- ★ Has exclusive all-wool quilted core*
- ★ Reinforced for extra wear
- ★ Cannot glaze
- ★ Readily reclaimed

GUARANTEED Quality, Workmanship and as represented

Copyright 1957—Journal Box Servicing Corp.

*Patent applied for

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"30 Years in Car Lubrication"

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TIME-SAVING IDEAS FOR FEBRUARY 1958

Volume 132 • No. 2

MOTIVE POWER AND CAR

Aluminum Center Sills Prove Themselves 25

Freight cars built of aluminum have, until now, usually been "all-aluminum" except for the underframes. Aluminum Company of Canada has tested and applied extruded aluminum center sills.

Highlights of ICC Annual Reports 28

Reports by the Commission, by the Section of Railroad Safety, and by the Director of Locomotive Inspection show the condition of today's equipment and indicate what the future will be.

Pennsy Tests Its Lube Oil 30

Quantometer recently installed by the Pennsylvania has speeded lubricating oil examinations by nation's biggest diesel operator. Entire program is joint endeavor by shops and laboratory.

ACF Cuts Plywood Lining Costs 7% 32

Removable but theft-proof plywood lining panels are possible because ACF used end-welded studs and special nuts in Milwaukee and Reading box cars. Costs were cut at the same time.

How MoPac Reclaims Diesel Cylinder Heads 34

Production-line set-up at North Little Rock handles head repairs for the entire Missouri Pacific. All types of heads can be reclaimed when they come to this shop for such repairs.

ELECTRICAL

Old Electrification Adds New Electrics 44

Possible life of electric locomotives is indicated by the fact that new units are entering service side by side with the original locomotives built 45 years ago.

Walking the Locomotive 45

Continuity of locomotive control circuits is assured by the Burlington's method of moving the locomotives back and forth from a position on the shop floor.

Roll Them Out Like New—Part 7 48

A discussion of shop procedure which will help the railroad shop management to determine which job shall be done by the railroad and which one by the service shop.

How Should a Brush Test Be Handled 58

An outline of two tests which will determine how to select the best brush for a specific application.

Here's Progress in Clearing Carbon Grounds 58

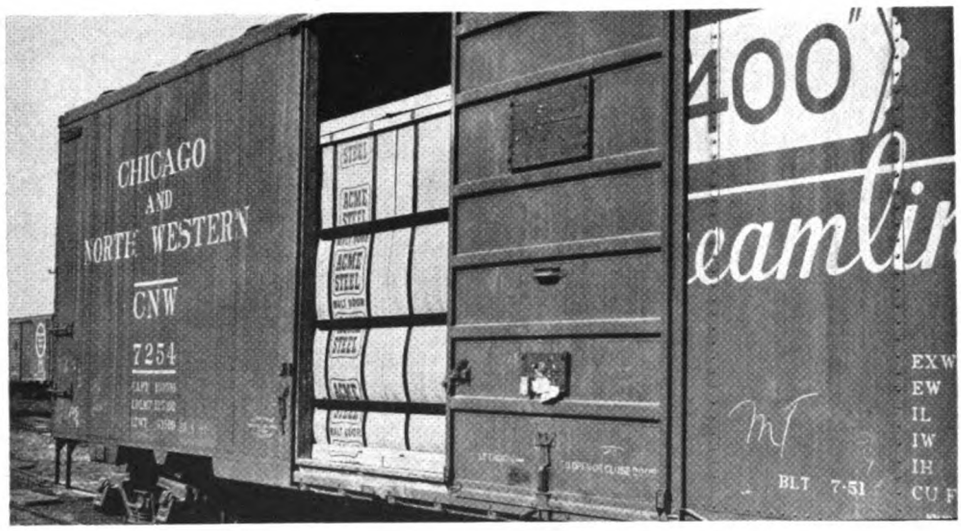
Sometimes it is possible to clear up grounds on diesel locomotive main generators and motors to permit the unit continuing in service until time for the next general repairs.

Diesel Days 63

Ninety volts on the control circuit of a diesel-electric locomotive left the maintainer in a daze, but the reason was really simple.

DEPARTMENTS

What's New in Equipment 6
Personal Mention 14
Report 14
Supply Trade Notes 16



Grain Door

This Acme steel door consists of a waterproof laminate of high strength burlap and paper supported vertically by steel slats. The steel slats and the laminate are securely attached to wooden members at top and bottom, commonly known as climb-out and pry boards. This fully factory assembled door rests against, but is not attached to, horizontal steel beams. The doors come in two heights: the 6-ft grain door, using two steel beams, and the 8-ft mail door, using three steel beams. The double steel reinforcement of the Acme door prevents all contact with the car door.

According to the manufacturer, one man can cooper a car (two doors) in 10 min. The door comes down in one piece, leaving no strapping on the door posts or walls of the car.

There is a major reduction in damage to walls and posts because only 20 nails per car are used with the grain size compared with a minimum of 135 per car with the paper door. The beams are reusable. *Acme Steel Company, Dept. RLC, 135th st. and Perry ave., Chicago 27.*

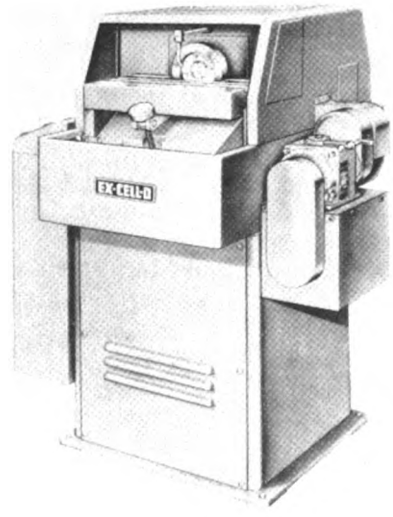
Desludging Cleaner

Magnus RR-737 has been developed for the removal of sludge accumulations in railroad diesel engines prior to general overhauls. This field-tested chemical celaner has proved successful in General Motors, Alco, and Lima engines. It removes lacquer-type sludge as well as soft sludge deposits from crankcase, oil passages, oil coolers, filter compartments, piston ring grooves, and working surfaces of moving parts on the top deck.

The complete cleaning operation is accomplished without dismantling any part of the engine. A short down time is required for desludging in comparison to disassembly and hand cleaning. Magnus RR-737 can be reused at least three times, provided sludge and solid contaminents are removed from the bulk of the solution by settling or by centrifuging. It is supplied ready for use. *Railroad Division, Magnus Chemical Company, Dept. RLC, South ave., Garwood, N.J.*

Reciprocating Tool Grinders

Two models of off-hand tool grinders of the double-end, reciprocating type are designed to perform two jobs—conventional grinding at one end and chip-breaker grinding at the other. The grinders have adjustable, power-controlled reciprocation of the grinding wheels so the operator only need hold the tool at the preset angle. A vertically adjusted table beneath the reciprocating chip-breaker wheel accommodates an adjustable tool block fixture which holds the tool in place while grinding the desired angle on the chip-breaker groove.

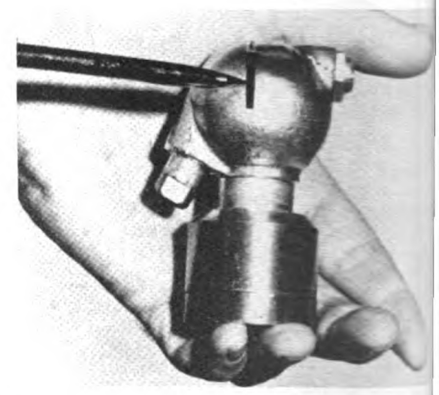


Other features include variable stroke, variable reciprocation, and motorized precision grinding spindle. *Ex-Cello-O Corporation, Dept. RLC, 1200 Oakman Blvd., Detroit 2*

Compressor Lubricant

Pydraul AC is a fire-resistant synthetic lubricant for air compressors. Carbon deposits on exhaust valves and in interstage equipment are said to be reduced with the lubricant in use. Some users of the fluid are reported to be obtaining 15 to 20 times longer operation between clean-outs of their air-compressor systems.

By minimizing carbon and resisting oxidation, Pydraul AC also serves to eliminate what are believed to be the causes of explosions and receiver fires in air-compressor systems. The auto-ignition temperature of the fluid is greater than 1,100 deg F. Lubricating qualities are equivalent to high-grade petroleum oils. *Organic Chemical Division, Monsanto Chemical Company, Dept. RLC, St. Louis 24.*



Rotating Spray Cleaner

This unit, designed specifically for cleaning tank truck compartments up to 12 ft long, may be adapted for other similar cleaning operations.

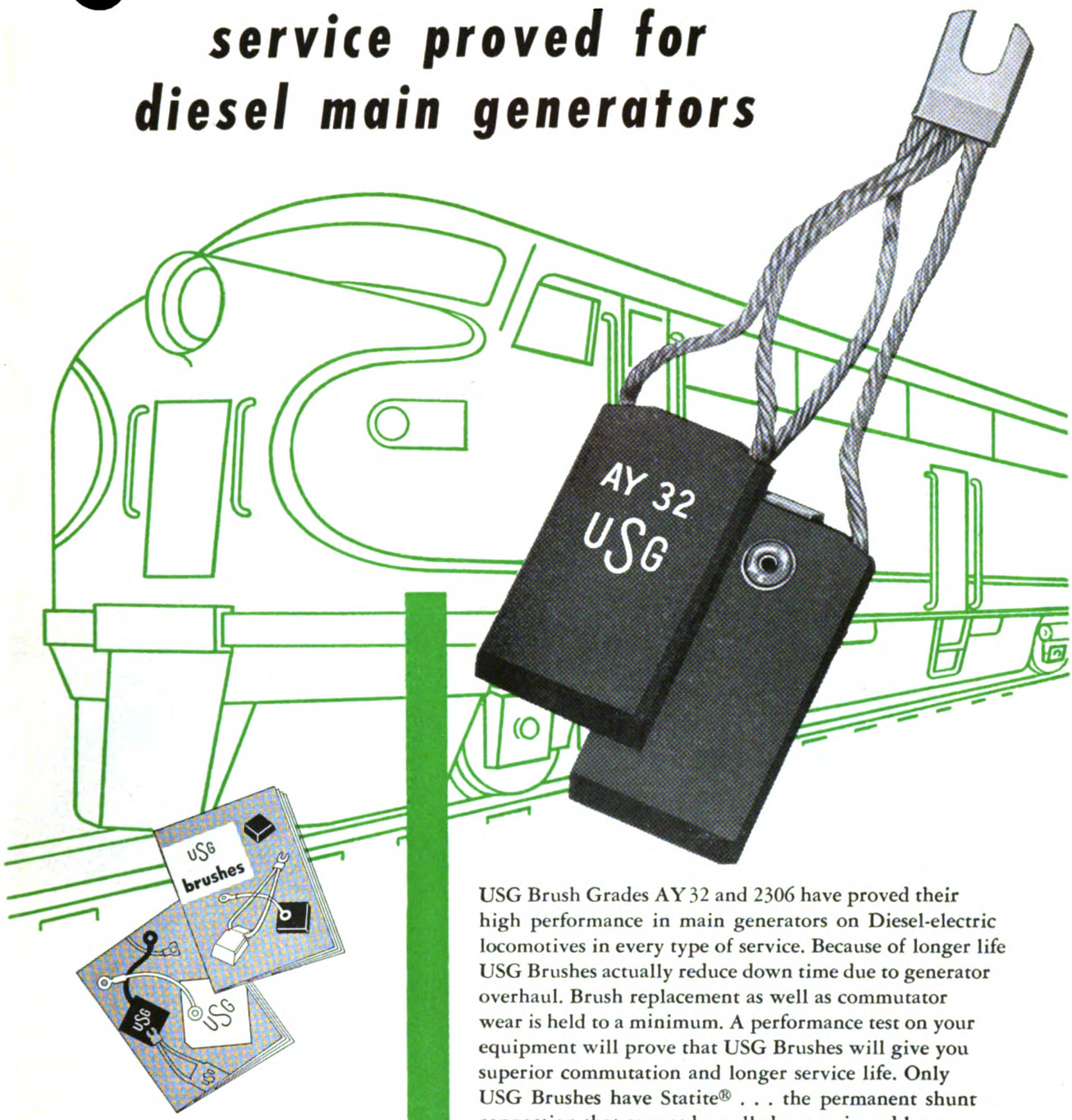
Spray-O-Mat is a portable unit, weighing only 7 lb and measuring less than 2½ in. in diameter. It is carefully engineered of stainless steel and consists of a hydraulically propelled rotary head which turns on a self-cleaning, hardened stainless-steel ball race. The spherical head is fitted with one wide-angle nozzle and is slotted to provide thrust-directional spray. An adjustable offset handle permits spinning of the spray head. The unit is fitted with a length of ¾-in. brass pipe threaded to accommodate solution hose.

The unit requires a minimum of auxiliary equipment: pump, pipes and valves, solution and drain hose, and heated solution tank. The pump should be capable of discharging 40 gpm at a head pressure of 60 psi. Rotating speed of the Spray-O-Mat should be about 60 rpm. *Oakite Products, Inc., Dept. RLC,* 146 *Rector st., New York* 6.

(Continued on page 18)

USG® BRUSH GRADES AY 32 AND 2306

service proved for diesel main generators



Send for the latest USG Brush Catalog B-56 and the new USG Brush Grade List, both are excellent for designing or for specific applications.

USG Brush Grades AY 32 and 2306 have proved their high performance in main generators on Diesel-electric locomotives in every type of service. Because of longer life USG Brushes actually reduce down time due to generator overhaul. Brush replacement as well as commutator wear is held to a minimum. A performance test on your equipment will prove that USG Brushes will give you superior commutation and longer service life. Only USG Brushes have Statite® . . . the permanent shunt connection that cannot be pulled out or jarred loose. Statite retains its original low millivolt shunt drop. Now's the time to try USG Brush Grades AY 32 and 2306 with Statite connections that have never failed in millions of miles of railroad service! Why not order today?

223

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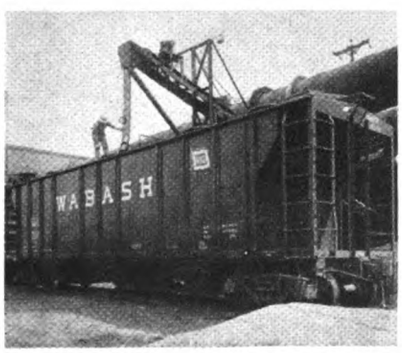
SHIPPER

another revenue-building

Shipper acceptance is the mainspring of railroad revenues. The levels of dependability, speed, load-carrying versatility and economy which your railroad offers, build this vital acceptance. *Your* selection of rolling stock that meets these requirements is the most important decision in this acceptance-building process.

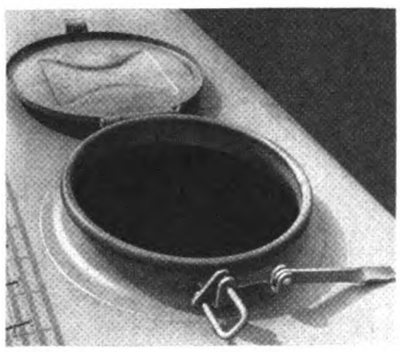
Representative of P-S Standardized Freight Cars—the rolling stock *best* able to meet these shipper requirements—is the PS-2 Covered Hopper. Its fine performance under all railroading conditions is typical of the rest of the Pullman-Standard line: the PS-1 Box Car, PS-3 Open Hopper, PS-4 Flat Car and PS-5 Gondola.

Write for copies of the P-S Freight Car Booklets shown at right or contact your Pullman-Standard representative. See how you can use the modern facilities, craftsmanship and know-how of Pullman-Standard standardized carbuilding to insure shipper acceptance.



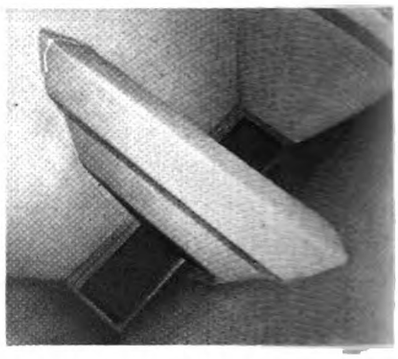
The PS-2 Handles Lading Fast

Shippers like the ability of the PS-2 to handle lading in a hurry. Circular hatches make loading or unloading from the roof quick, safe and easy. The flow of lading can be directed from the security of the unobstructed running board. Hatch location allows loading without developing voids or air pockets. Smooth interior and chute design speed lading flow to gates.



Keeps Lading Clean, Safe, Dry

The rugged design of the PS-2 surrounds lading with durable protection. All-welded construction eliminates joints and ledges that trap dirt. High, circular hatch coaming has reverse curved lip . . . diverts dirt and rain. Hatch covers have center pressure locking arrangement . . . make secure seal with coaming lip. P-S discharge gates seal and lock, lading is completely safe.



And PS-2 is Self-Cleaning

The key to the self-cleaning ability of the PS-2 is the all-welded design which provides an extremely smooth car interior. Properly sloped hopper sheets allow maximum free fall of lading to gates. The welded interior speeds clearing because there are no ledges, laps or pockets to trap lading. PS-2s empty faster, need little clean-up . . . they're back in service sooner

THE WORLD'S LARGEST BUILDER OF ROLLING STOCK

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SUBSIDIARY OF PULLMAN INCORPORATED

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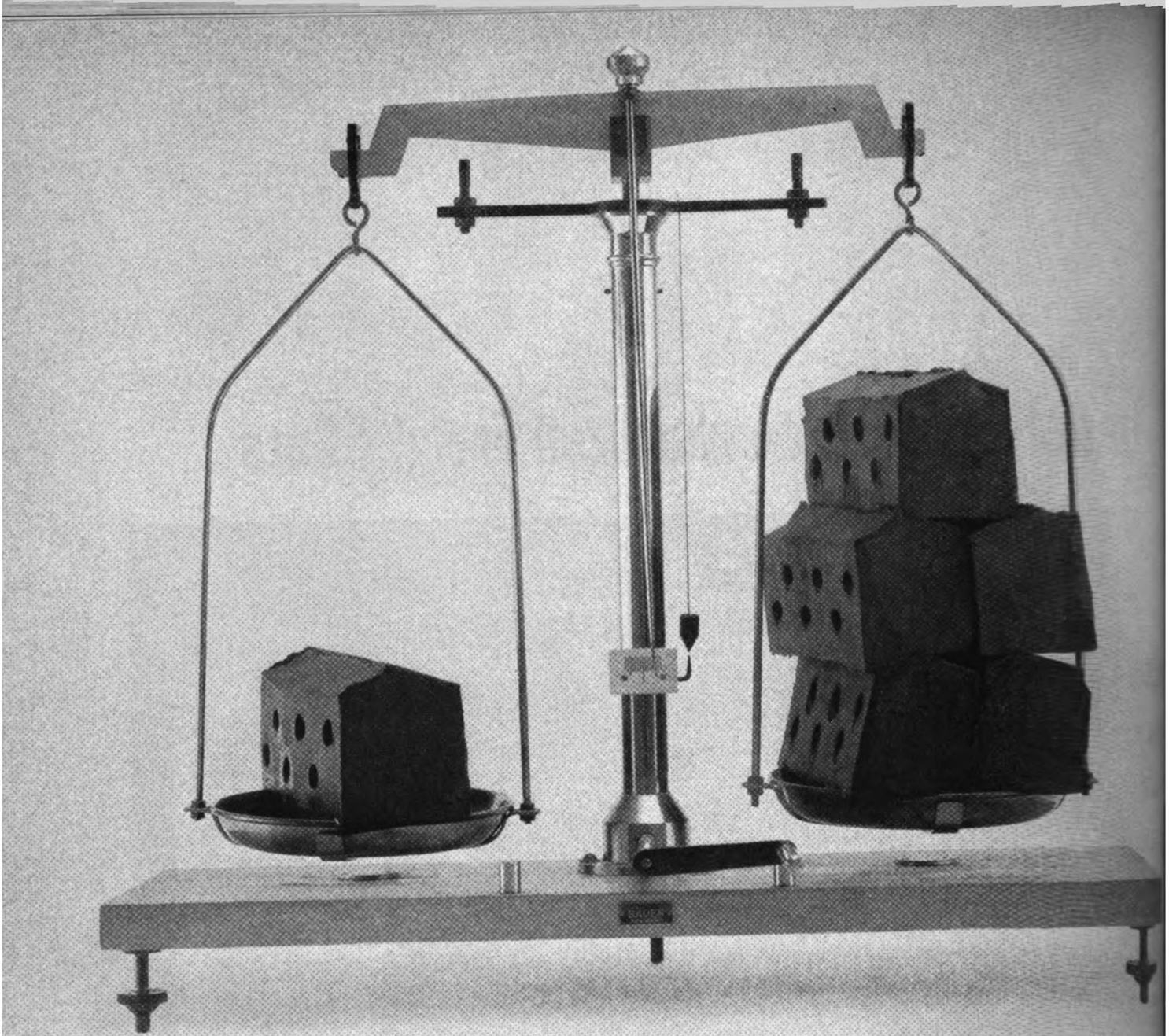
ACCEPTANCE

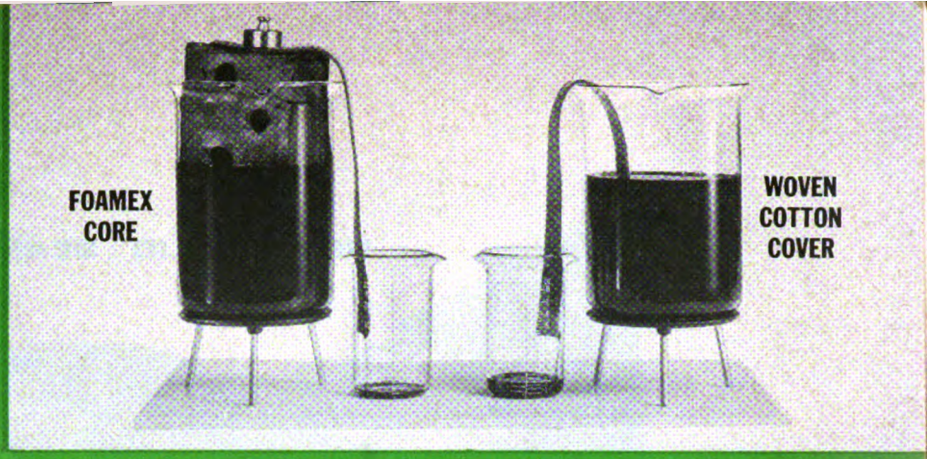
benefit of P-S Standardized Freight Cars



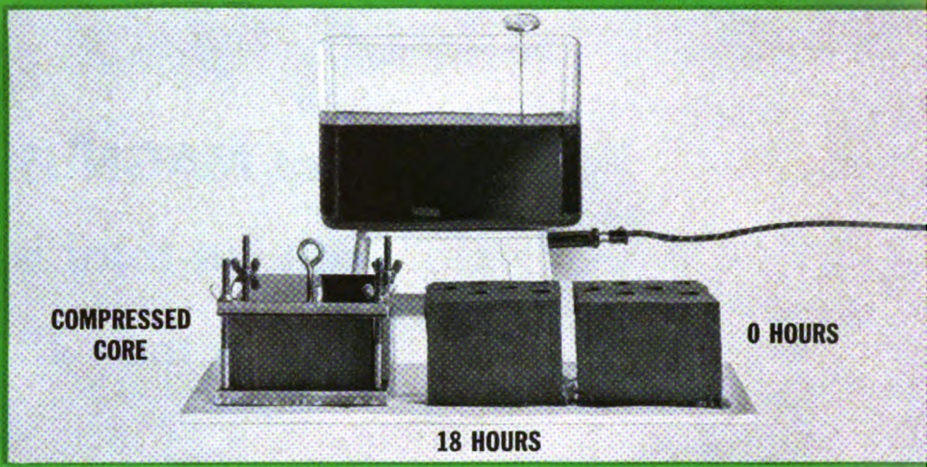
Why Redipak Twin Pads with Firestone* FOAMEX® provide superior lubrication

Redipak's Foamex core holds over 5 times its weight in oil!

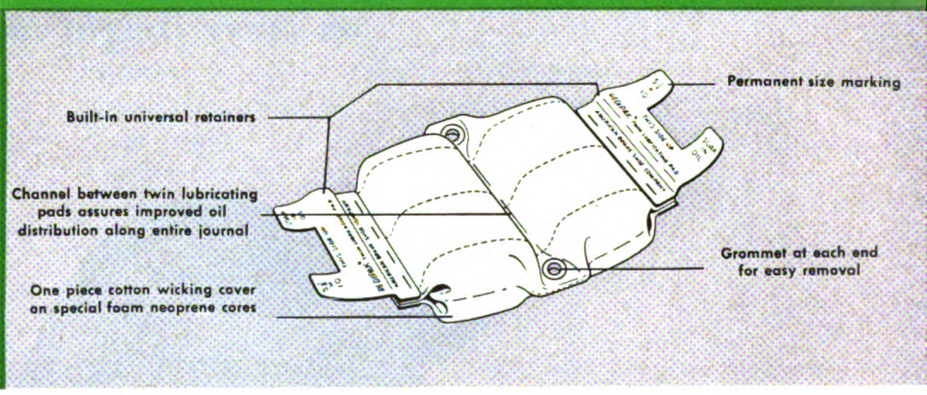
Redipak Twin lubricating pads hold an amazing amount of oil. Why? Mainly because of the Foamex core with its millions of interconnected cells. One sample of oil-soaked Foamex weighs as much as five and one-half dry samples of the same size . . . in other words five times its own weight in oil! Thus, the Redipak Twin core provides a generous oil reservoir—even when there is accidental loss of free oil.



BOTH CORE AND COVER WICK OIL! Both the cotton cover and the Foamex core in Redipak Twin lubricating pads move a steady flow of oil to the journal. The woven cotton cover, unmatched in wicking ability, is lint-free. The foamex core not only provides the proper resilience, but it too wicks oil when saturated . . . all adding up to doubly effective lubrication!



REDIPAK TWINS KEEP THEIR SHAPE. The Foamex cores in Redipak Twin lubricating pads are produced to our physical specifications to resist taking a set under extremes of temperature. In this demonstration, adapted from actual production tests, one of two identically-sized samples has been compressed to 80% of its original height and immersed in oil at 250F for 18 hours. At the end of that time, there was no difference in height between the tested sample on the left and the untested sample on the right. Despite compression under heat, the Foamex core held its shape!



Superior lubrication that will effectively control hot boxes is assured with Redipak® Twin lubricating pads, because of their unique design and the excellent lubricating properties of their woven cotton covers and Firestone Foamex cores.

Take the Foamex core . . . more than just a mechanical filler, this material, which is produced by Firestone to our physical specifications, actually wicks oil when saturated, holds over five times its own weight in oil, and keeps its shape and resiliency under extremes of temperature.

The wicking ability of cotton hardly needs explaining. When woven into a seamless cover for Redipak Twin pads, the result is a highly efficient wicking material that will not lint or glaze. Add to these properties, a unique design that provides superior oil distribution and positive shift prevention and you have Redipak Twin lubricating pads.

A special formulation of Foamex is used for Redipak Twin pads

GEARED TO PROGRESS
RPI MEMBER

AMERICAN Brake Shoe COMPANY

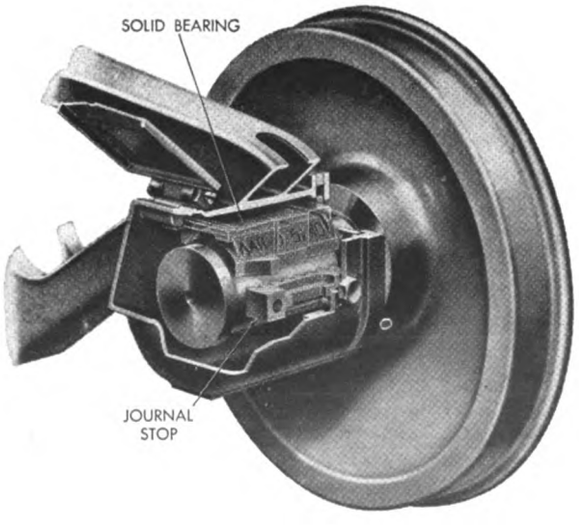
RAILROAD PRODUCTS DIVISION
530 Fifth Avenue • New York 36, New York
In Canada: Canadian Bronze Co., Ltd.

HOW SOLID BEARINGS AND JOURNAL STOPS

It's a fact...

that MAGNUS R-S JOURNAL STOPS can cut total bearing operating costs to less than 13 cents per car day!

Here's the low-cost way to get better bearing performance fast—save almost $35 per year now on every freight car equipped with Journal Stops

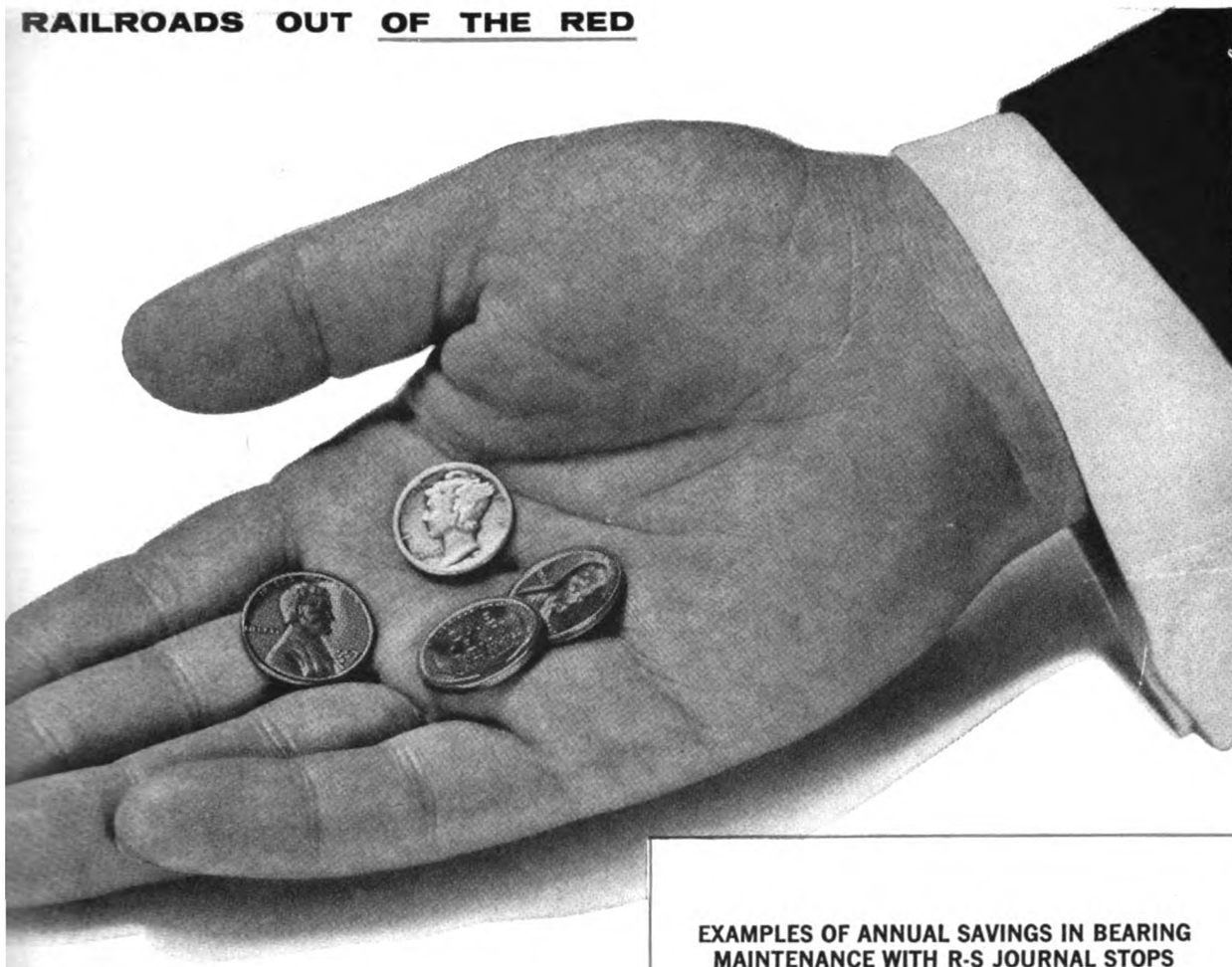


Railroads using R-S Journal Stops today save al
$35.00 per car year in reduced operating costs a
—fewer hot boxes, longer bearing and axle life,
reduced service attention. They save the comp
cost of the R-S Journal Stops, including installat
in less than 3 years — bring the total cost of s
bearing operation down to less than 13¢ per car

That's just one of the facts about low-cost s
bearings with R-S Journal Stops — proved now
over 5000 cars in service. Potential savings are
greater. That's because R-S Journal Stops stab
the bearing assembly, give the low-cost solid b
ing a chance to work at optimum efficiency. T
cuts truck maintenance costs all along the line

MAGNUS METAL CORPORAT

RAILROADS OUT OF THE RED



s the practicability of 3-year repack intervals educes the requirements for an effective rear

d with R-S Journal Stops you still have all the tages which low-cost solid bearings bring to ad rolling stock. You can take the maximum make the fastest schedule. You save excess weight and get lowest possible running resist- n pounds per ton. Best of all, you'll be sure of nd of bearing performance you want at a price an afford to pay.

ite us for *all* the facts. Magnus Metal Corpora- 111 Broadway, New York 6; or 80 E. Jackson Chicago 4.

EXAMPLES OF ANNUAL SAVINGS IN BEARING MAINTENANCE WITH R-S JOURNAL STOPS

Description	Without Stops	With Stops	Savings
Repairing Hot Box Set-Outs ...	$9.05	$0.91	$8.14
Damage to Equipment	2.01	.20	1.81
Fires Due to Hot Boxes	.29	.03	.26
Cut Journals	1.35	.34	1.01
Defective Brgs., Routine Insp. .	2.69*	1.35	1.34
Routine Yard Inspection	40.82	24.11	16.71
Material—Not Included Above			
Defective Bearing Replacements	4.36*	2.18	2.18
New Axles	3.35	.84	2.51
Spring Packing Retainers	.46	.00	.46
		TOTAL SAVINGS	$34.42

**Technical Advisory Committee figures. Other figures in this column based on 1954 costs as determined by AAR.*

MAGNUS

Solid Bearings

RIGHT FOR RAILROADS
... in performance ... in cost

ry of **NATIONAL LEAD COMPANY**

LOCOMOTIVES AND CARS REPORT FOR FEBRUARY

Keller Becomes AAR Vice-President—Research

W. M. Keller

F. Peronto

F. H. Stremmel

William M. Keller, assistant vice-president operations and maintenance department, Association of American Railroads, Chicago, has been elected vice-president—research, to direct Association of American Railroads research activities relating to the engineering, mechanical and electrical fields. Fred Peronto, secretary of the Mechanical Division, has been appointed executive vice-chairman of the division. L. T. Donovan, assistant to executive vice-chairman, is now assistant executive vice-chairman. Frank H. Stremmel, assistant to secretary, succeeds Mr. Peronto as secretary.

"Big Jawn" Is Gone

Norfolk & Western experimental locomotive 2300, known as "Big Jawn" and "Jawn Henry," has been permanently retired. Railroad mechanical men said maintenance costs of the 4,500-hp coal-fired steam-turbine-electric had become prohibitive, even though it burned some 30 per cent less coal than conventional locomotives. They said the principle of using coal as a fuel in such an engine was proved, regardless of component deficiencies.

Experience gained from close and continued performance study led to the belief that a more economical and dependable coal-burning steam-turbine locomotive could be designed and built. Locomotive 2300, one of the largest steam locomotives ever built, and the joint project of the road, Westinghouse Electric, Babock & Wilcox, and Baldwin-Lima-Hamilton. It was delivered to the N&W in May 1954. Serious difficulties were encountered in the electrical, feedwater and turbine components. The complexity of the control system and of the locomotive generally combined to cause an excessive number of failures which often took it out of service.

In-Date Air Brake Stenciling Required

The General Committee of the AAR has approved a recommendation of the Committee on Brakes and Brake Equipment affecting all cars which receive in-date air brake testing while on repair tracks. Stenciling or marking is to be applied as soon as possible on either side or end of reservoir which includes "I.D. S.C.T. (In-date Single Car Test), plus abbreviated initials of the shop or station, railroad, month, day and year."

The above has reference to revised AAR publication "Rules for Inspection, Testing and Maintenance of Air Brake Equipment of Locomotives and Cars." Rule 101 (a) provides that, when a freight car having brake equipment not due for periodic attention as indicated by standard stenciling is on shop or repair tracks, the brake equipment must be tested by the single car testing device providing that car has not been tested within the previous 90 days as indicated by stenciling. The same type and size of markings shown on page 147 of the 1957 Code of Interchange Rules can be used, always utilizing the clear space on the opposite side or end of reservoir. If cleaning marks are on end of reservoir, the I.D.S.C.T. marks should be placed on the side, or vice-versa. An example of the new markings would be as follows:

I.D.S.C.T.
DET 12-27-51
NYC

The AAR advises there will be a few cases where it will be necessary to follow in general the provisions of par. (f) of Interchange Rule No. 60.

Owen Clarke Resigns

Owen Clarke, chairman of the Interstate Commerce Commission, has resigned to become vice-president of the Chesapeake & Ohio in Cleveland.

Orders and Inquiries for New Equipment

Placed Since the Closing of the January Issue

Diesel-Electric Locomotive Orders

Road and builder	No. of units	Horsepower	Service	Other detail
PENNSYLVANIA:				
Alco Products	44	1,800	—	19 delivered. Remaining 25 for delivery by April.
	6	1,000	—	For delivery by March.
Electro-Motive	140	1,750	—	Delivered.
	35	1,200	—	For delivery by May. All 225 units ordered under lease.

Freight-Car Orders

Road and Builder	No. of cars	Type of car	Cap. tons	Length, ft.	Other detail
CANADIAN NATIONAL:					
Eastern Car Div.,					
Dominion Steel & Coal Corp.	700	Triple hopper	—	—	Deliveries of these 1,850 cars to begin early this year.
National Steel Car	250	Triple hopper	—	—	
	200	Refrigerator	50	—	———
Canadian Car	200	Triple hopper	—	—	———
	200	Gondola	70	—	
Marine Industries	300	Flat	50	—	
CHICAGO, ROCK ISLAND & PACIFIC:					
American Car & Fdry.	10	Covered hopper	70	—	Unit cost, $10,725. For delivery this month.
LOUISVILLE & NASHVILLE:					
Pullman-Standard	1,100	Gondola	—	45	Deliveries of these 2,000 cars to be completed this year.
	500	Gondola	—	52	
American Car & Fdry.	200	Gondola	—	40	
	100	Covered hopper	70	—	
Greenville Steel Car	100	Gondola	—	65	
NORTH AMERICAN CAR:					
Bethlehem Steel	40	Mill type gondola	70	—	———
Pullman-Standard	2	Covered hopper	70	—	———
TEXAS & PACIFIC:					
Company shops	75	Insulated box	—	50½	Delivery of 200 cars to be completed by June.
	100	Flat	—	53½	
UNION PACIFIC:					
American Car & Fdry.	200	Gondola	70	—	———
Bethlehem Steel	200	Gondola	70	—	———
Pullman-Standard	200	Box	50	—	———

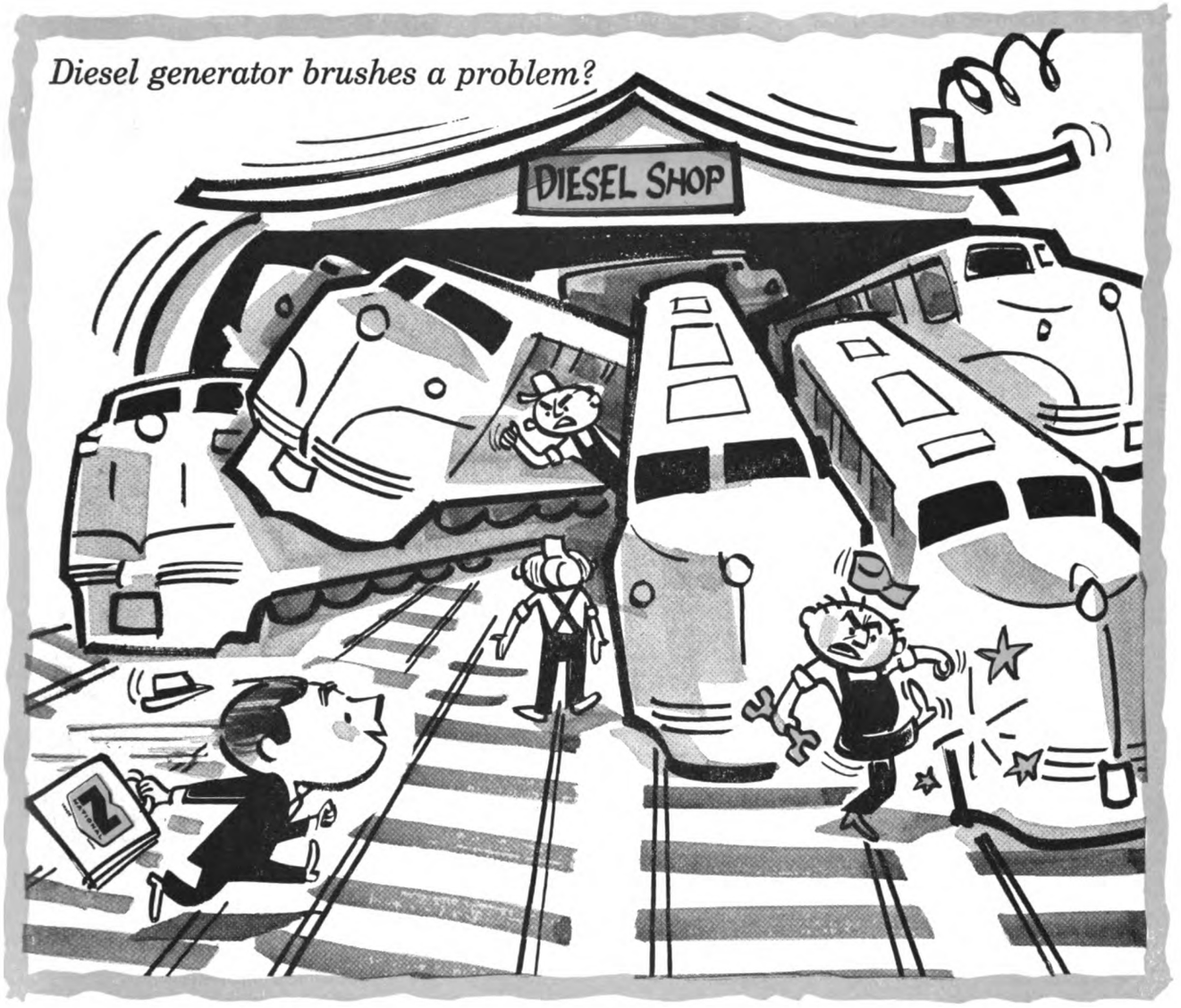
Personal Mention

Bangor & Aroostook.—*Oakfield, Me.:* DAVID MERRILL appointed division master mechanic. Formerly assistant engineer, Derby, Me.

Boston & Maine.—*Boston Engine Terminal:* WALLACE H. CHAPLIN appointed general foreman, succeeding O. O. LEWIS, retired. Position of general diesel foreman abolished.

Chesapeake & Ohio.—*Walbridge, Ohio:* [illegible] HENSHAW appointed general car foreman

(*Continued on page 16*)



Your NATIONAL TRADE-MARK brush man helped this road stop excessive maintenance!

JOHN PEDLAR

Serious copper dragging and flashovers kept putting diesel main generators out of action on this mid-western railroad. The result, says "National" Carbon Brush Man, John Pedlar, was a critical repair and maintenance problem.

By carefully analyzing generator workload, John Pedlar, working closely with the railroad, found improper brush selection the source of trouble. Grade DE-2 "National" brushes were recommended and applied. The road now considers its generator brush operation completely satisfactory.

John Pedlar and his fellow "National" Carbon Brush Men have been solving railroad brush problems for years. Their experience and training – backed by "National" *long term brush development* – make them the logical consultants on any railroad brush problem.

Call your "National" Brush Man today. Or write National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

The terms "National", "N" and Shield Device, and "Union Carbide" are registered trade-marks of Union Carbide Corporation

NATIONAL CARBON COMPANY • Division of Union Carbide Corporation • 30 East 42nd Street, New York 17, N. Y.

UNION CARBIDE

Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. *In Canada:* Union Carbide Canada Limited, Toronto.

Personal Mention

(*Continued from page 14*)

succeeding S. B. THORNTON, deceased. *Grand Rapids, Mich.:* D. C. DELEEUW appointed general foreman, succeeding H C. WOODWORTH, retired.

Delaware, Lackawanna & Western. — *Scranton, Pa.:* F. T. JAMES appointed assistant to vice-president—operations, and L. B. COLEMAN, assistant general manager. Positions of general superintendent of motive power and equipment and general superintendent of operations abolished.

M. B. Crowley, GN

R. C. Johnston, PRR

T. W. Bellhouse, StL&W

Great Northern.—*St. Paul, Minn.:* MILES B. CROWLEY appointed superintendent of motive power. *Career:* Started with the GN at Everett, Wash., in 1926 as an enginehouse laborer. Subsequently became electrician; assistant superintendent of electrical operations; traveling engineer; diesel supervisor and master mechanic at Seattle in January 1957.

Spokane, Wash.: RICHARD G. TAUSCH, assistant shop superintendent, Hillyard shops, appointed superintendent of shops, succeeding A. H. MALENKE, retired.

New York Central.—*Beech Grove, Ind.:* CARROLD STEVENSON appointed superintendent shop—car; F. E. BRITTON, general foreman, passenger department, and R. T. TOMLINSON, assistant general foreman, passenger department. *Buffalo:* F. H. MCHENRY appointed master mechanic, Buffalo division. Formerly superintendent diesel terminal, Collinwood, Ohio.

Pennsylvania.—*Buffalo:* RICHARD C. JOHNSTON appointed superintendent of equipment, Northern region. *Sunnyside Yard, Long Island City, N. Y.:* HAROLD L. WOOD appointed master mechanic, succeeding Mr. Johnson. *Chicago:* W. H. MILLER appointed master mechanic, Northwestern Region, succeeding Mr. Wood.

St. Louis Southwestern.—*Pine Bluff, Ark.:* T. W. BELLHOUSE appointed to newly created position of assistant superintendent motive power. *Career:* Began in mechanical department of Cotton Belt in 1934, serving successively as a special apprentice, mechanical inspector, general locomotive foreman, and master mechanic, southern division, Tyler, Tex.

Western Maryland.—*Hagerstown, Md.:* GEORGE M. BEISCHER appointed assistant superintendent motive power. Formerly assistant mechanical superintendent, Warren district, New York Central, at Cleveland.

Obituary

Lewis D. Freeman, until recently trustee of the New York, Ontario & Western, died in Middletown, N. Y., on January 11. Prior to his service with the O&W, Mr. Freeman was examiner for the Railroad Division, Reconstruction Finance Corporation.

C. E. Barrett, superintendent car department, Chicago, Milwaukee, St. Paul & Pacific, died in the Milwaukee County Emergency Hospital, Milwaukee, on January 5.

Selected I.C.C. Motive Power and Car Statistics

• Freight Service

M211 Item No.		Month of October 1957	Month of October 1956	10 months ended with October 1957	10 months ended with October 1956
3	Road locomotive miles (000):				
3—06	Total, Diesel-electric	37,742	38,848	368,294	371,673
3—07	Total, electric	699	752	6,943	7,300
3—04	Total, locomotive-miles	40,334	44,035	396,237	420,964
4	Car-miles (000,000):				
4—03	Loaded, total	1.661	1.816	16,167	16,929
4—06	Empty, total	998	979	9,598	9,377
6	Gross ton-miles-cars, contents and cabooses (000,000):				
6—03	Total in Diesel-electric locomotive trains	113,007	114,669	1,089,332	1,074,345
6—04	Total in electric locomotive trains	2,228	2,417	22,000	22,734
6—06	Total in all trains	122,072	130,310	1,186,296	1,216,838
10	Averages per train-mile (excluding light trains):				
10—01	Locomotive-miles (principal and helper)	1.02	1.03	1.02	1.03
10—02	Loaded freight car-miles	43.9	44.2	43.4	43.2
10—03	Empty freight car-miles	26.4	23.9	25.7	23.9
10—04	Total freight car-miles (excluding caboose)	70.3	68.1	69.1	67.1
10—05	Gross ton-miles (excluding locomotive and tender)	3,227	3,174	3,118	3,103
10—06	Net ton-miles	1,471	1,479	1,449	1,424
12	Net ton-miles per loaded car-mile	33.5	33.4	33.4	33.0
13	Car-mile ratios:				
13—03	Per cent loaded of total freight car-miles	62.5	65.0	62.7	64.4
14	Averages per train hour:				
14—01	Train miles	18.5	18.2	18.8	18.5
14—02	Gross ton-miles (excluding locomotive and tender)	59,240	57,218	59,048	56,907
M240 Item No.					
14	Miles per diesel-electric unit day:				
14—01	Road freight units	209.5	—	209.2	—
14—02	Road passenger units	425.8	—	440.4	—
17	Car-miles per freight-car day:				
17—01	Serviceable freight cars	46.7	48.8	46.1	46.8
17—02	All freight cars	44.6	47.0	44.1	45.0
18	Average net ton-miles per freight-car day	933	1,021	926	956
19	Per cent of home cars of total freight cars on line	110.1	112.3	110.6	112.0

• Passenger Service

M213 Item No.					
3	Road motive-power miles (000):				
3—06	Diesel-electric	19,209	20,062	194,766	202,828
3—07	Electric	1,083	1,212	11,432	12,458
3—04	Total	20,542	21,822	209,231	222,696
4	Passenger-train car-miles (000):				
4—08	Total in all locomotive-propelled trains	206,382	224,405	2,145,386	2,305,585
4—11	Total in Diesel-electric locomotive trains	191,518	205,462	1,984,706	2,096,407
12	Total car-miles per train-mile (average):	9.50	9.80	9.74	9.91

• Yard Service

M215 Item No.					
1	Freight yard switching locomotive-hours:				
1—03	Diesel-electric[1]	3,858,207	4,026,981	37,835,697	38,025,526
1—06	Total	4,003,156	4,301,936	39,425,228	40,699,047
2	Passenger yard switching hours:				
2—03	Diesel-electric[1]	240,556	249,896	2,403,445	2,473,188
2—06	Total	267,774	282,662	2,682,110	2,810,200
3	Hours per yard locomotive-day:				
3—02	Diesel-electric	15.2	16.2	15.3	15.7
3—05	Serviceable	15.5	16.2	15.5	15.7
3—06	All locomotives (serviceable, unserviceable and stored)	14.3	15.1	14.3	14.3
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.68	1.65	1.69	1.67
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locotives)	0.80	0.78	0.77	0.75

[1] Excludes B and trailing A units.

Supply Trade Notes

PULLMAN-STANDARD CAR MANUFACTURING COMPANY. — *Robert F. Bogan* has been appointed manager in charge of special railroad projects for the sales department. *Lewis H. Warheit* has been appointed manager of works of the Butler, Pa., freight-car plant, succeeding *H. S. Hogan*, retired.

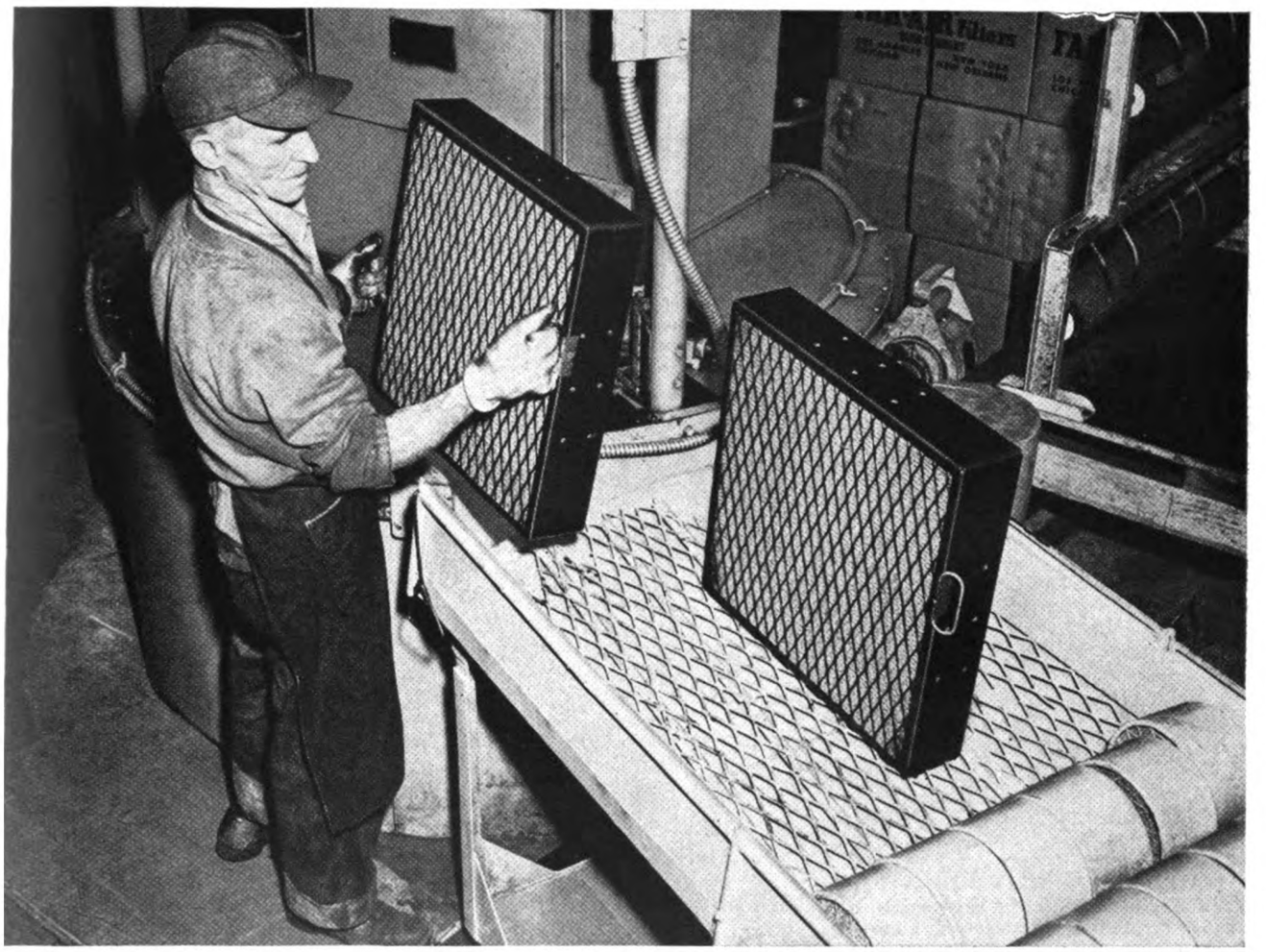
(*Continued on page 18*)

ENGINEER'S FIELD REPORT

PRODUCT CHEVRON FILTER COAT

FIRM FARR COMPANY
Los Angeles, Calif.

Air filter firm uses Chevron coating exclusively

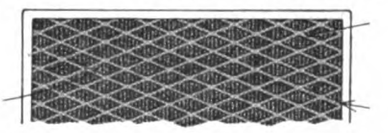


Farr Co. supplies impingement-type air filters, oiled with Chevron Filter Coat, to nearly all major railroads. A leader in air filtering, Farr has used Chevron Filter Coat (formerly Calol) exclusively for three years, since product was introduced.

Farr's Director of Research, S.F. Duncan, recommends gel-structure oils like Chevron Filter Coat because they improve filter efficiency. Other users report Chevron Filter Coat increases filtering efficiency as much as 50% over oils they previously used.

A heated centrifugal oiler of their own design (above) applies Chevron Filter Coat to all Far-Air filters just before they are packed for shipment. Filters are immersed in heated oil for 30 seconds, then raised and spun at 300 rpm for a minute to remove excess oil.

Why Chevron Filter Coat ups efficiency of air filters



- High wicking ability—quickly soaks dust particles
- Will not drip off screens—gives full filtering efficiency through entire service period
- Easily applied and cleaned—but will not wash off in service
- Does not separate, harden, or change properties in service
- Non-corrosive to metals

CHEVRON Industrial Lubricants

For More Information about this or other petroleum products, or the name of your nearest distributor, write or call any of the companies listed below.

TRADEMARK "CHEVRON" AND "CHEVRON" DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

Supply Trade Notes

(*Continued from page 16*)

OAKITE PRODUCTS, INC. — *Walter G. Sittmann,* has been transferred to 315 Alexander st., Rochester, N.Y., to head the new Upper New York State Division, comprising the technical field representatives and warehousing facilities based in Albany, Utica, Syracuse, Binghamton, Elmira, Rochester, Buffalo, and Scranton, Pa. *John P. Melhado,* a field representative in New York, succeeds Mr. Sittmann as Pittsburgh division manager. *Victor L. Baltzell,* representative in Dallas, has been appointed manager of the new Mid South Division at Fourth and Broadway, Louisville, Ky. This division consists of representatives in Cincinnati, Nashville, Little Rock, Knoxville, Louisville, Evansville, Jackson, Shreveport, Memphis, and New Orleans.

■

AMERICAN AIR FILTER COMPANY. — *Frank K. Platt,* has been appointed to the newly created position of central regional manager, with headquarters in Detroit. Mr. Platt was previously president of the Air Engineering Company.

■

EX-CELL-O CORPORATION. — *Robert W. Ford* has been appointed sales manager, Machine Tool Division; *Herbert A. Knack,* sales manager, Continental Tool Works Division, and *Ruddy M. LaPierre,* manager, Bushing sales.

■

ADAMS & WESTLAKE COMPANY. — *R.F. Herrold* has been appointed eastern sales manager, Transportation Division, succeeding *F.C. Rauch,* retired.

■

UNITED STATES STEEL CORPORATION, U.S. STEEL SUPPLY DIVISION. — *Lloyd C. Fitzgerald,* assistant manager of sales, appointed manager of sales, Chicago district, succeeding *Donnell W. Newman,* resigned.

■

T-Z RAILWAY EQUIPMENT COMPANY. — *Richard R. Jenkins* and *James G. Eliasek* appointed representatives in southeast states.

■

HUCK MANUFACTURING COMPANY. — *Russell J. Roe* has been named engineering representative for users of fasteners in the Kansas, Missouri, Iowa, and Nebraska area.

■

JOHN A. ROEBLING'S SONS CORPORATION. — *E. George Hartmann* has been elected vice-president, sales, at Trenton, N.J., succeeding *Ernest C. Low,* retired. *F.T. Updike,* chief engineer, has been appointed sales manager.

■

BROOKS OIL COMPANY. — *Alfred A. Paul* has been appointed general manager of engineering-sales at Cleveland. Sales and engineering offices have been moved from Pittsburgh, to the executive offices and plant at 3304 E. 87th street, Cleveland. The Pittsburgh office continues as a district sales office.

■

KELITE CORPORATION. — *Kenneth C. Edson* has been appointed Los Angeles district sales manager.

■

SPEER CARBON COMPANY. — *Arthur L. Olender* has been appointed a development engineer, Speer Carbon Division. Mr. Olender was previously a development engineer with the Union Carbide Corporation.

A. S. Chalfant

F. B. Steele

R. A. Bollman

S. O. Dunn

BUFFALO BRAKE BEAM COMPANY. — *Robert A. Bollman,* eastern railway sales representative, has been appointed sales manager.

■

A.M. BYERS COMPANY. — *A.S. Chalfant,* director of steel sales, has been appointed general manager of sales. *R.I. Enzian* is manager of wrought-iron sales; *F.E. Farnan,* manager sales promotion, and *R.J. Bricmont,* manager engineering service. *Harry R. Rowland,* former vice-president, is now a consultant on wrought-iron sales. *Jed J. Merrill* has been appointed Philadelphia division manager, succeeding *E.L. MacWhorter,* retired, and *Harry E. Thompson* succeeds Mr. Merrill as New England division manager at Boston.

■

WHEELABRATOR CORPORATION. — *James F. Connaughton,* executive vice-president, has been elected president, succeeding *Otto A. Pfaff,* retired.

■

GOULD-NATIONAL BATTERIES, INC.— *F.B. Steele* has been appointed district manager at 100 East Ohio street, Chicago.

■

SPARTON CORPORATION. — The entire operation of Sparton Tri-Belt Freight Car Loading System has been transferred from Jackson, Mich., to Sparton Corporation, Allied Steel and Conveyors Division, 17333 Healy avenue, Detroit, Mich. *Warren [illegible] McKittrick,* vice-president of Sparton and [illegible] visional general manager of the Allied Ste and Conveyors Division, has been appoint manager of Tri-Belt activities. *W. R. Mar,* assistant to the president of Sparton, will [illegible] sist Mr. McKittrick in the sales of the Tri Belt loading system. *W. Bradley Gilkey* an *David D. Wood,* assistants to vice-president will head up the sales force.

■

ARCHER - DANIELS - MIDLAND COM PANY. — *Howard M. Lillejord* has become a sales representative for ADM Freight Line Products at Minneapolis.

■

Obituary

FRANK J. SWANSON, 67, sales and serv engineer for the Holland Company, c December 21 in Wesley Memorial Hosp Chicago.

■

SAMUEL O. DUNN, chairman emeritus the Simmons-Boardman Publishing Corp tion and editor emeritus of *Railway A* died January 4 in Grant Hospital, Chicag Mr. Dunn was chairman of the board an chief executive officer from 1931 to 195 Since then he had been chairman emeritu

Summary of Monthly Hot Box Reports

Month	Cars set off between terminals with hot boxes: System	Foreign	Miles per car set off
October 1953	3,863	6,493	293,796
October 1954	5,182	6,985	234,472
1955			
October	3,966	7,182	271,364
November	2,010	3,972	493,184
December	1,819	3,774	522,444
1956			
January	2,029	4,302	462,029
February	2,570	5,611	341,542
March	2,517	6,212	346,853
April	3,202	6,881	290,626
May	4,672	10,903	196,688
June	6,777	15,125	135,774
July	8,484	16,067	113,573
August	9,891	16,892	113,474
September	6,834	12,629	149,970
October	4,357	8,429	243,505
November	2,650	5,560	359,759
December	2,256	4,436	438,425
1957			
January	3,373	6,121	291,453
February	3,272	6,844	264,538
March	3,164	6,687	307,306
April	3,949	8,447	228,493
May	6,580	12,691	154,387
June	8,285	16,277	115,749
July	10,438	18,819	96,064
August	9,662	17,639	109,839
September	6,736	12,066	147,694
October	4,616	8,050	233,004

What's New

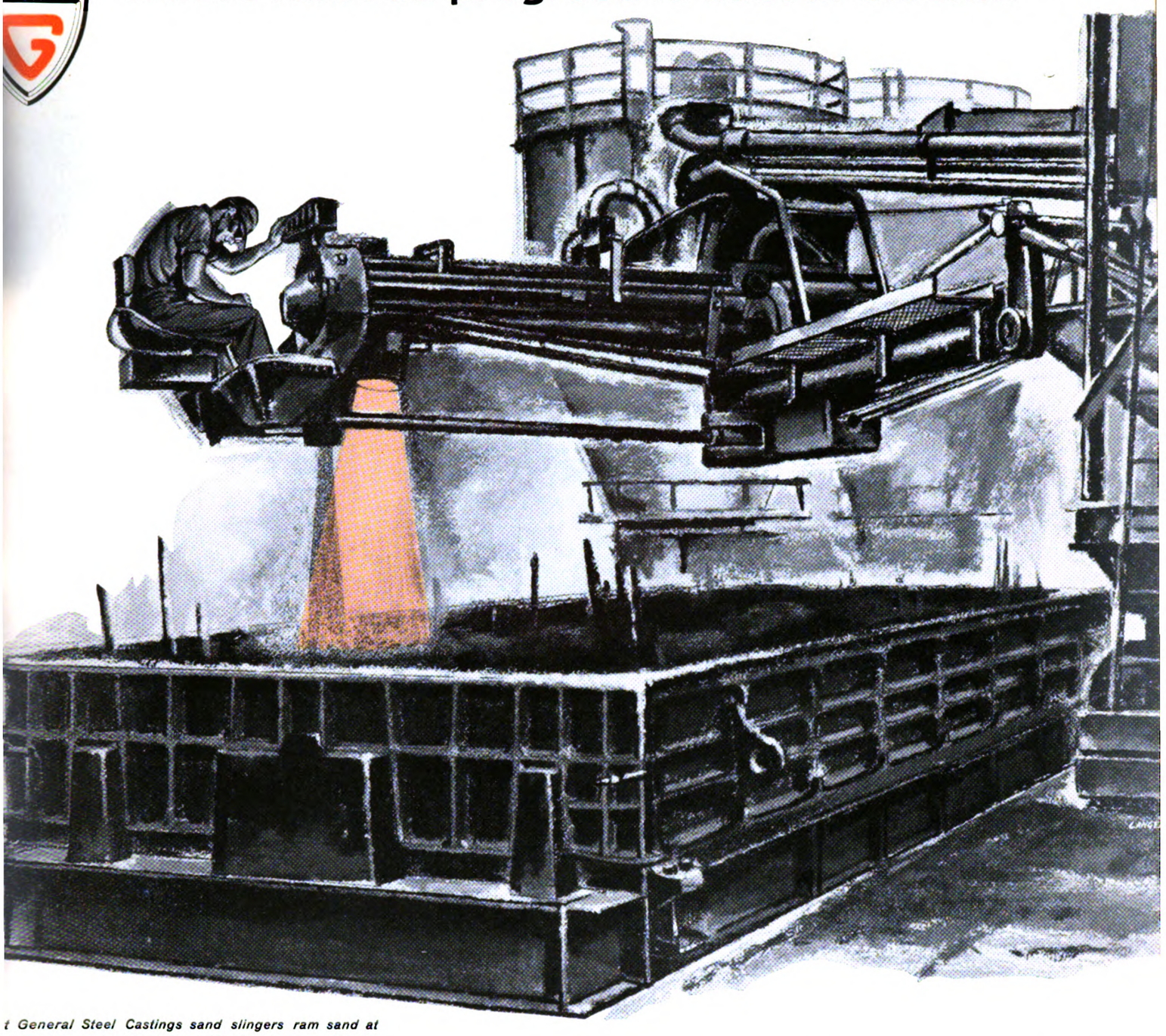
(*Continued from page 6*)

Spindle Nose

The spindle nose now incorporated in 28 siz and styles of Cincinnati knee-and-colu milling machines is known as Arbor-Loc a provides a quick and easy method of changi arbors. Dimensions and basic design of t

(*Continued on page 62*)

Where railroad progress is cast in steel....



t General Steel Castings sand slingers ram sand at ıe rate of a ton per minute. Skilled operators and mas- ve machines make short work of ramming huge and ɔmplex molds.

Modern railroads run on ideas . . . and one of the biggest is the General Steel concept of combining many separate parts into a large one-piece casting. This forward step has resulted in great progress for railroads and other industries throughout the world.

Users of castings from General Steel are assured of decreased maintenance costs, improved operation, greater safety and maximum availability of equipment.

Bulkhead flat car equipped with one-piece cast steel underframe and interlocking cast steel ends.

- *longer life with greater availability*
- *safer shipping for heavier loads*
- *maintenance free cast steel underframe*

ENERAL STEEL CASTINGS

Another Advance . . .

new Holland **Ride Stabilizer RS-2**

upgrades existing freight car trucks to HIGH SPEED SERVICE **AT A SAVING OF OVER 80% of NEW TRUCK COSTS**

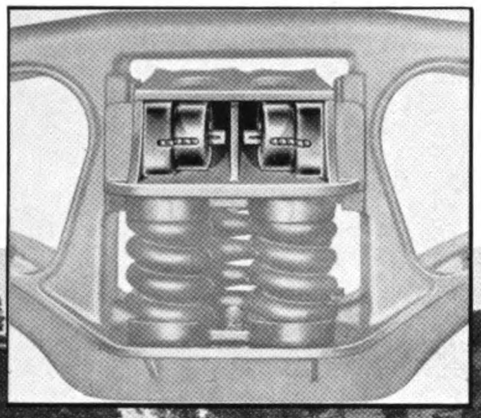
New

- Center Retention Means for simplified assembling and dismantling
- Larger control spring for full face pressure—longer life

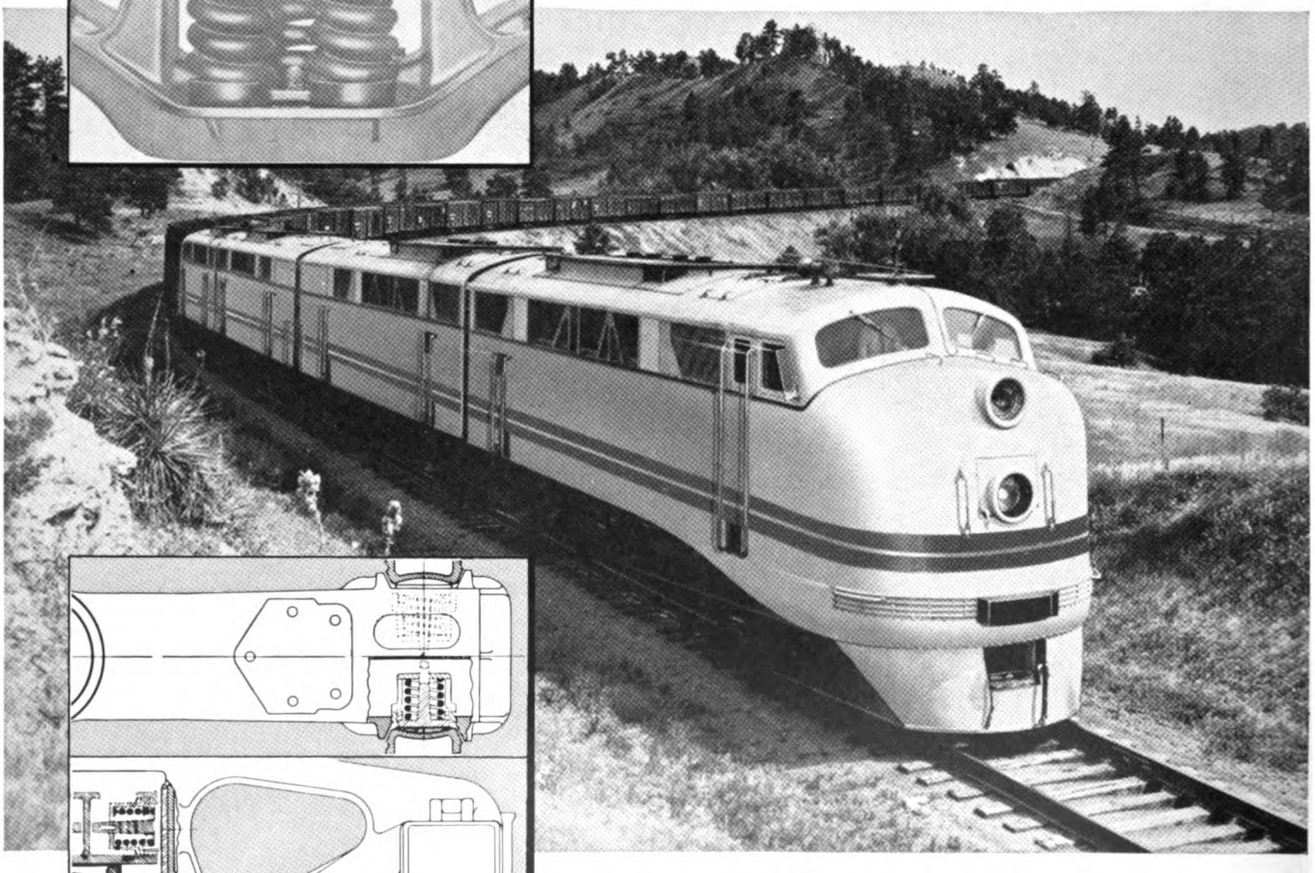
An Eastern Railroad is now upgrading 2800 of their old trucks with new Holland RS-2 units for service under 1400 rebuilt freight car bodies. Enjoy the benefits of **reduced damage claims, longer equipment life** and **longer service from roadbeds.** Takes the jolt and jar out of that old freight car . . . Stabilizes the ride laterally, vertically and longitudinally just like the new modern trucks . . . The Holland Style RS-2 can be applied to all freight car truck bolsters of A. A. R. approved design.

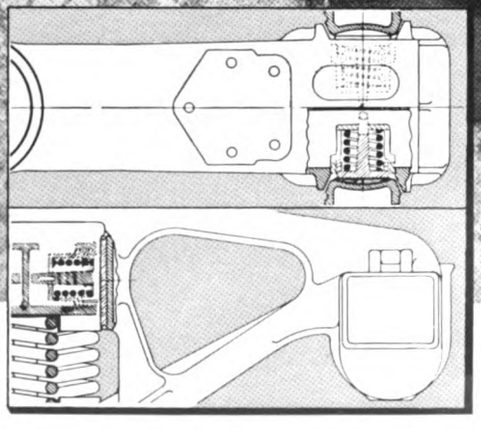
Write for our new Tell-All Bulletin RS-2 and for complete information . . . Ask about our on-the-job engineering service.

HOLLAND COMPANY
332 S. MICHIGAN AVE. • CHICAGO 4, ILLINOIS



The Holland Ride Stabilizer actually becomes an integral part of the bolster and ride control not just a temporary measure . . . Installation is simplified and direct Engineering assistance from Holland is available.

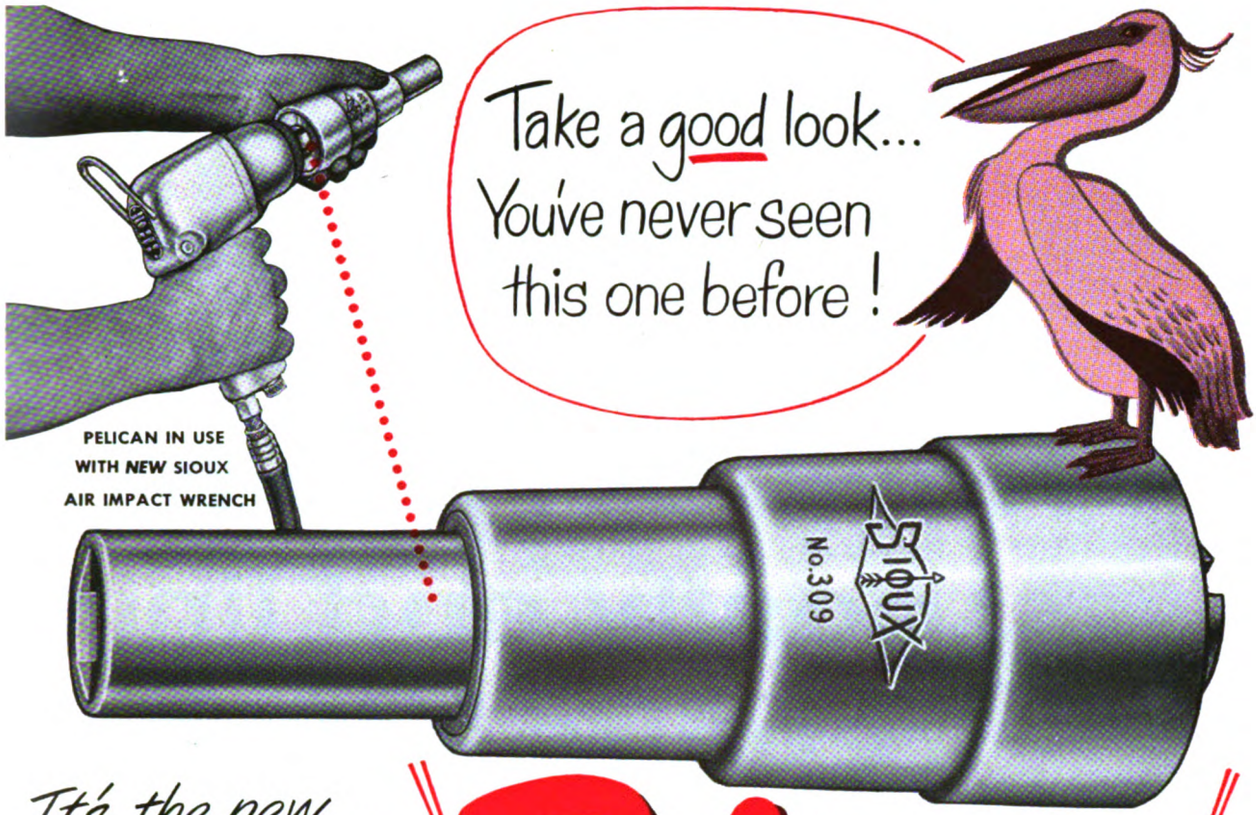




Cutaway top view shows new large control spring

Cutaway side view shows new Center Retention Means

298



It's the new...

SIOUX

Pelican NUT ACCUMULATOR

With the SIOUX Pelican Nut Accumulator attached to an impact wrench, ten nuts can be spun off and back on again without being touched by human hand. It will hold ten ¾" or 13/16" hex nuts either 7/16" or ½" thread.

The center stem with its load of nuts is easily removed and another empty stem installed in its place. With one extra stem, 20 nuts can be removed and replaced; with two extra stems, 30 nuts, etc.

The Pelican may be used with any ½" or ⅝" square drive, air or electric impact wrench. The simple, dependable mechanism has few moving parts. It cannot be damaged by overloading. It drives without loss. Nuts can't get dirty.

The SIOUX Pelican costs little in relation to the time it saves. It quickly pays for itself. It's brand new and exclusively from SIOUX to you.

LOADED CENTER STEM

SIOUX

LOOK UNDER TOOLS ELECTRIC!

ALBERTSON & COMPANY, Inc.

SIOUX CITY, IOWA, U. S. A.

• *NEW* AIR IMPACT WRENCHES • *NEW* AIR SCREWDRIVERS • ELECTRIC IMPACT WRENCHES • DRILLS • SANDERS • POLISHERS • SCREWDRIVERS • PORTABLE SAWS • FLEXIBLE SHAFTS • ABRASIVE DISCS

✓ *Here's* **STANDARD'S** *responsibility to the railroads at work*

Now! Cut down costly end lining repairs with new

LINE-RITE, new low maintenance End Lining, is another development that reflects Standard's "responsibility to the railroads" ...the creation of new products to make your operation more efficient, more profitable.

LINE-RITE is assembled metal and wood lining that greatly reduces maintenance costs—even cuts down the *need* for maintenance through added strength. Infestation hazards are reduced also. The end result is more cars available for high-class lading.

Maintenance costs slashed—the dovetailed metal socket running from the end lining retainer to the floor of the car provides solid backing for the entire length of the board . . . locks each board positively and securely in place. New LINE-RITE *virtually eliminates* the costly operation of replacing broken and missing end lining boards.

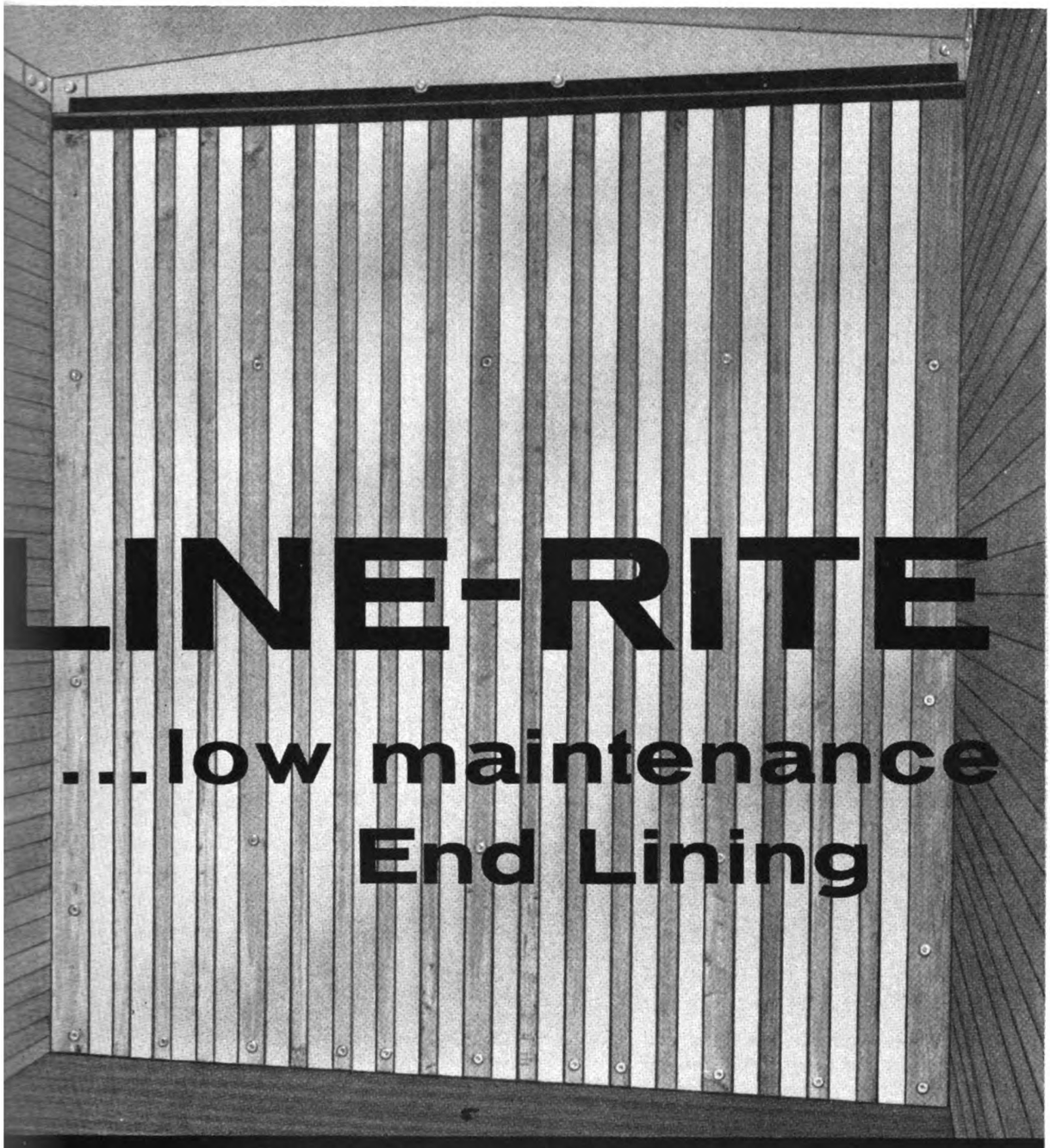
Added strength through distribution of impact—the assembled metal and wood lining gives additional strength to the end of the car by distributing impacts over a larger area and allows the corrugations in the outer steel end to exert resistance to impact as a unit... not only are maintenance costs slashed but the *need* for maintenance is greatly reduced.

Infestation hazard reduced—the continuous steel member, after proper application, provides a positive wall which effectively blocks the infiltration of flour and grain into the space behind the lining.

More high class lading cars—you'll have many more cars available for profitable high class lading because LINE-RITE will reduce the number of cars out of service . . . you'll have less maintenance at lower cost *and* damage to lading will be minimized.

STANDARD RAILWAY EQUIPMENT MANUFACTURING COMPANY

General Office: 4527 Columbia Ave., Hammond, Ind. • New York • Chicago • St. Paul • San Francisco

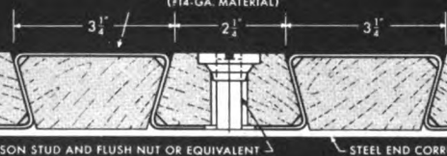


LINE-RITE

...low maintenance End Lining

Here's how LINE-RITE works!

SECTION SHOWING CONTOUR
STANDARD VERTICAL END LINING
(#14-GA. MATERIAL)

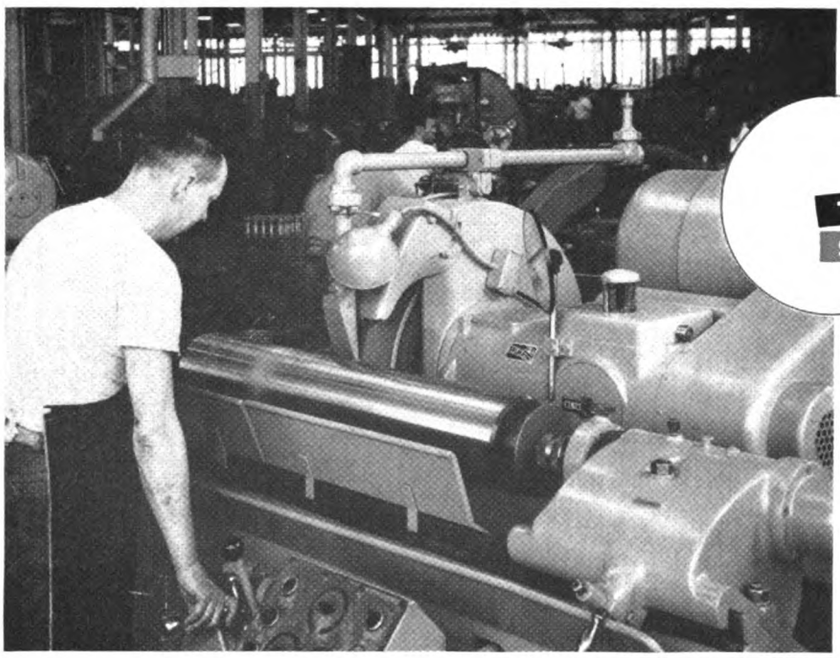


The interior surface of each end of the car is covered by four metal panels formed to provide alternate dovetailed sockets for retention of the end lining boards. Each metal panel, covering approximately one-fourth of the end area, is held in place with welded studs and a new flush type round nut. This fastening method allows easy removal of the lining in quarter sections for repairs or replacement of boards. No furring strips need be used and cheaper grades of lumber have proved adequate as inserts in the dovetailed sockets. The wooden inserts provide an adequate nailing area and greatly reduce condensation problems.

LINE-RITE has been tested and proved in over 2500 cars. Ask your Standard representative for details.

Cincinnati Filmatic 16" Plain Grinders

Quickly give your large cylindrical work...



THE HIGHEST QUALITY SURFACE FINISH

FILMATIC

Flame hardened radial drill columns, requiring an extra high quality surface finish and precise accuracy, are ground on this CINCINNATI FILMATIC 16" x 72" Plain Grinding Machine.

Rapid stock removal of metal is fine for production. But it often works a hardship on surface finish, especially for precision cylindrical grinding operations. CINCINNATI FILMATIC 16" Plain Grinders have changed this relationship . . . these machines grind away excess stock at an amazing rate, and then with no extra attention whatever they finish to final size and produce an extra high quality surface. The 16" machine and its companion 14" size are well equipped to grind heavy precision work at the lowest cost.

FILMATIC grinding wheel spindle bearings will last the life of the machine; they automatically adjust for load (rapid stock removal of metal).

Automatic grinding wheel balancing. Formerly a time-consuming chore; perfect balance now accomplished in a few seconds while the machine is running.

Finger-tip selection of table traverse rates; infinitely variable, electronically controlled.

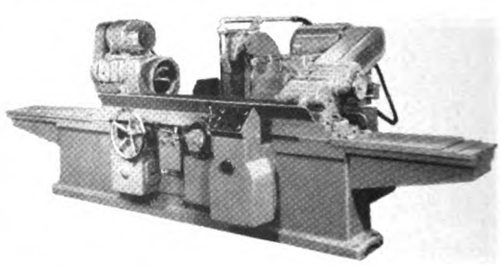
Automatic lubrication of ways and principal units.

Ample power for rapid metal removal . . . 20 hp spindle drive; 2 hp headstock drive (16" machine).

CINCINNATI

CINCINNATI FILMATIC 14" and 16" Plain Grinders offer many additional advantages for shops concerned with grinding large cylindrical work. Get all the facts. Brief data in Sweet's Machine Tool File, and complete data may be obtained by writing for catalog No. G-607-1.

CINCINNATI FILMATIC 16" x 48" Plain Grinding Machine. Brief data for both 14" and 16" sizes tabulated below. Get complete information by writing for catalog No. G-607-1.

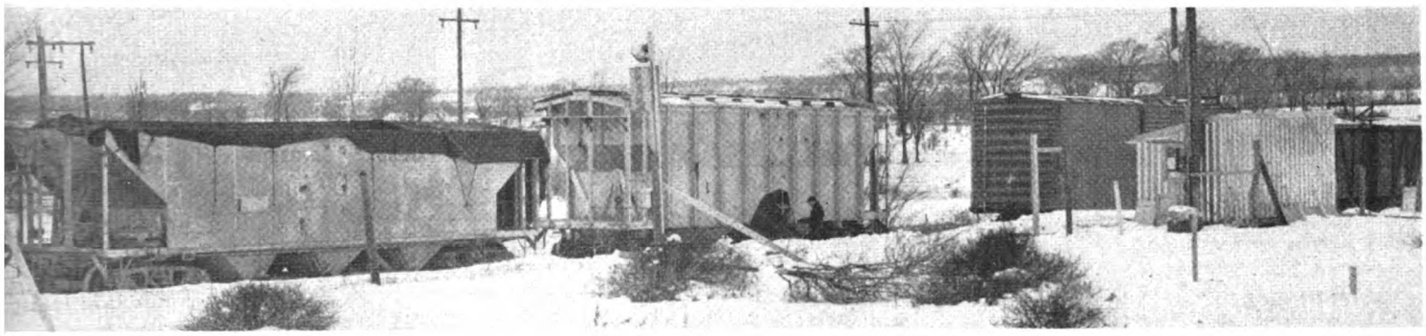


Size	Spindle Drive	Headstock Drive	Lengths between centers
14"	20 hp	1½ hp	36, 48, 72, 96, 120, 144, 168"
16"	20 hp	2 hp	36, 48, 72, 96, 120, 144, 168"

CINCINNATI®

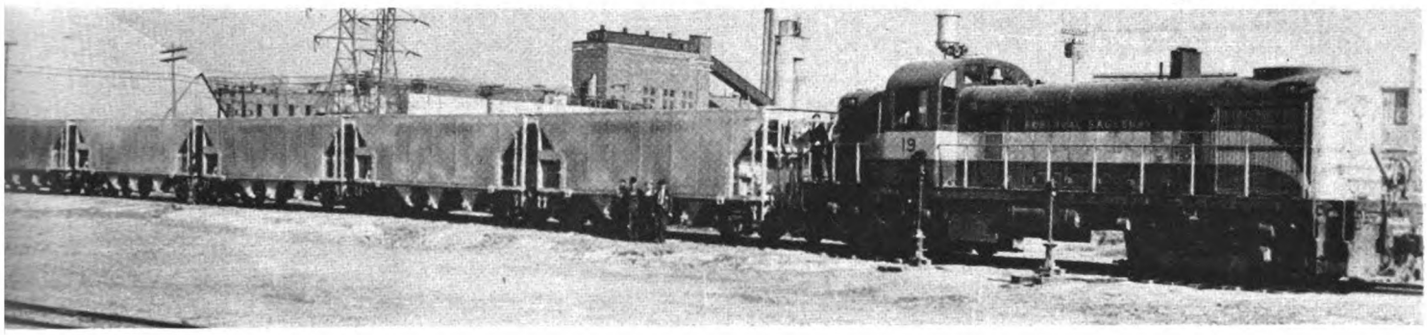
CENTERTYPE GRINDING MACHINES • MICRO-CENTRIC GRINDING MACHINES
CENTERLESS GRINDING MACHINES • ROLL GRINDING MACHINES • SURFACE GRINDING MACHINES • CHUCKING GRINDERS • CENTERLESS LAPPING MACHINES

CINCINNATI GRINDERS INCORPORATED • CINCINNATI 9, OHIO



At the Laboratory . . .

. . . and in Regular Service



Aluminum Center Sills Prove Themselves

After 75 impact tests, the laboratory the Aluminum Company of Canada ports that the company's extruded uminum center sill has successfully ithstood impact forces up to 947,000 . "It is confidently expected," the re-ort continues, "that the center sill could ithstand considerably higher forces ace the present tests were limited by e failure of the welded steel draft lugs id not the center sill itself."

The extruded Z section's shape is very milar to that used in the standard AR steel center sill. Like the rolled AR sill, the Alcan design requires that vo Zee's be welded together. All of this ilminates a long and thorough develop-ent program.

In early applications aluminum was erely substituted for steel. As experi-ice proved that aluminum stands up ell to service conditions and has excel-nt resistance to the weather, brine and orrosive cargoes, designs were altered suit the characteristics of aluminum. he next step was to design and build whole structures in aluminum. Aluminum hopper cars, with aluminum center sills, have been among the first complete structural units to be built.

To prove the soundness of these designs and to gain a better knowledge of the stresses involved, it was decided to conduct static, shakeout fatigue, and impact tests. These tests, first of their kind to be carried out in Canada, were conducted by Aluminium Laboratories Limited at Kingston, Ont. They were sponsored by the Aluminum Company of Canada. Canada's two major railroads were greatly interested in the tests and gave valuable assistance.

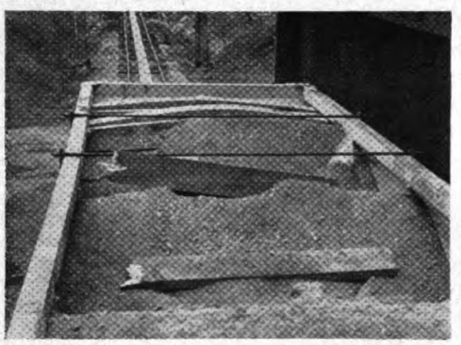
An all-welded, covered, aluminum hopper car built by Marine Industries for bauxite service in Jamaica was used for static testing. This type of car has a rated capacity of 50 tons and was fabricated from Alcan 65S-T6 (US 6061-T6) extrusions and Alcan B54S-H11 (US 5054) plate. Side sheets are ¼-in. thick, the side posts are formed from plate 5/16-in. thick, and roof sheets are ⅛-in. thick. The car has a light weight of 32,500 lb, a load limit of 136,500 lb; uses the Alcan aluminum center sill.

Strain gages were located on the top and bottom of the center sill, on the side sills, side posts, side sheets and bolsters where it was thought the major stresses would occur. The car was loaded with water and strains were recorded at sev-

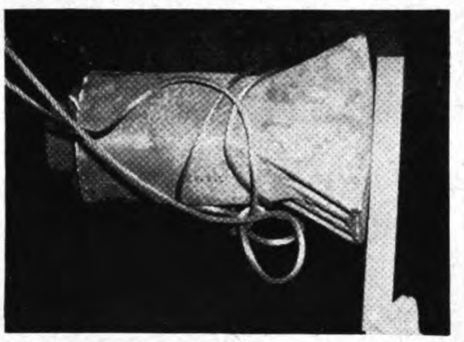
COVER PHOTO

Bauxite haul from Port Alfred, Que., to Arvida is the principal assignment for 148 aluminum hopper cars of the Roberval & Saguenay. Fewer cars, reduction in switching, and less locomotive fuel all were part of calculations justifying aluminum cars for this 26-mile run. The last 30 of these cars are the only ones having aluminum center sills. These cars were built after an extensive series of tests conducted by the Aluminum Company of Canada at its laboratoris at Kingston, Ont.

Laboratory Impact Tests Found These Things . . .



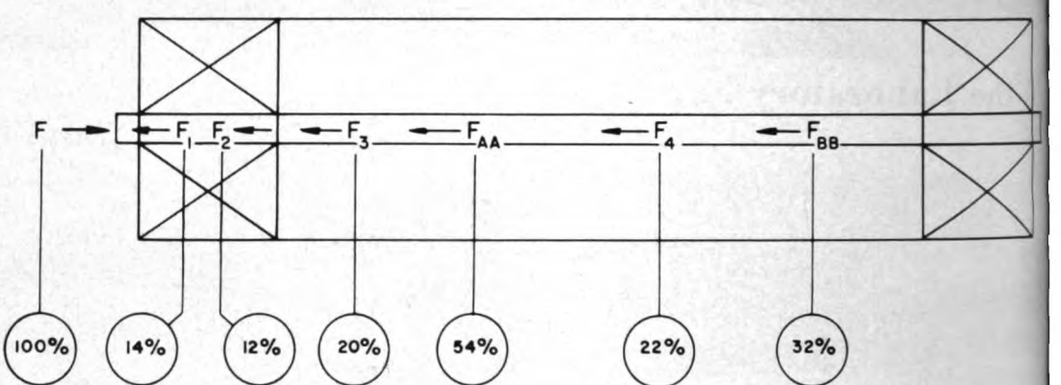
Near-million-pound impacts broke 2 x 2-in and 5 x 5-in. blocking used to compartmentize sand lading in strike car.



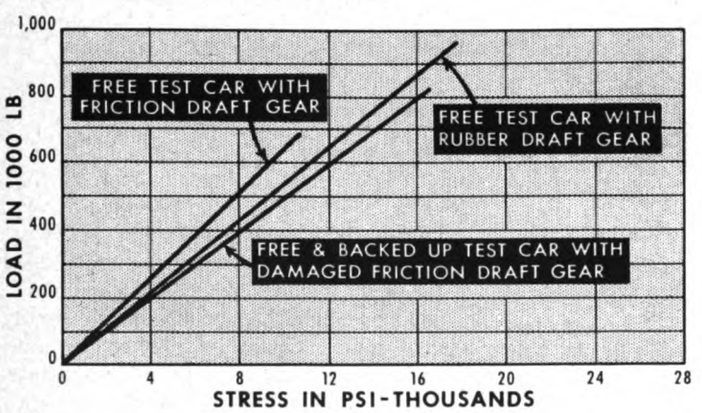
Deformation of body and end of draft gear occurred during friction gear test series. Draft lugs deformed too.

Complete failure of draft lugs occurred during rubber gear tests. Despite bulging, weld at top of sill did not fail.

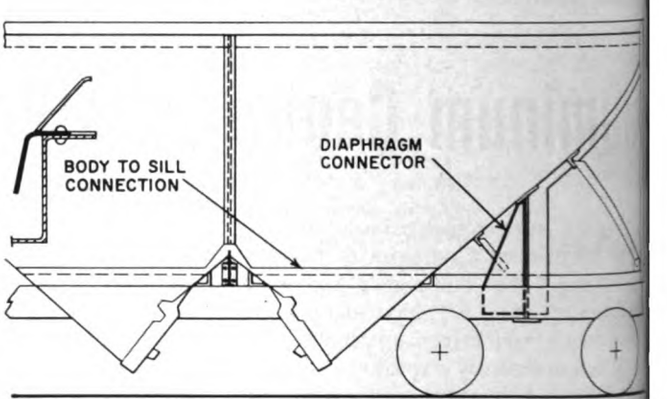
F — Impact force
F_1 — Component taken from center sill by two diagonal end sill braces in compression.
F_2 — Component taken from sill by two end sill braces in tension.
F_3 — Component taken from sill by bolster, diaphragm and truck.
F_{AA} — Component remaining as compression in sill under first hopper.
F_4 — Component taken from sill by central diaphragm.
F_{BB} — Component of impact force remaining as compression in sill under second hopper; distributed to rear of car.



Force distribution from sill to body was determined. No appreciable bulging occurred in body sheets, indicating design was adequate for the impacts involved.



Stresses developed in center sill of the test car under the first hopper showed little variation whether or not the car was backed up.



Proof that body-to-sill connections were adequate was obtained in tests. These connections were designed for 1,000,000-lb impacts.

eral load increments up to the rated capacity of 100,000 lb.

Static loading of the car to its capacity of 100,000 lb produced a maximum recorded stress of 6,350 psi in the vertical post and 6,000 psi in the adjacent panel. These stresses should not be critical. They occur on the face of the post and at the center of the panel. The maximum stress observed in vertical welds was only 3,150 psi. This was a compressive stress. It should not be critical, even from a fatigue point of view. Stresses in the top and bottom chords of the sides, in the bolsters, and in the center sill were below 1,500 psi. For this loading they are relatively unimportant.

Vertical deflection at the mid-point of the center sill was 0.10 in. and that of the side walls, acting as a plate girder, was 0.04 in. The side walls were sufficiently stiff to carry all the load out to the ends of the car, rather than loading the center sill in bending. The difference in deflection between the side walls and the center sill indicates that a transverse stiffener would be desirable to reduce the bending in the center sill.

Shake-out fatigue tests were included in the test program because no fatigue data were available on open and covered hopper cars. A six-ton car shake-out was operated at full capacity for an hour on each of these empty aluminum car bodies weighing approximately five tons.

An aluminum-body, open hopper car with steel center sill was made available by the Roberval & Saguenay for shake-out fatigue tests. This car has a light weight of 36,600 lb and a rated capacity of 70 tons. The maximum alternating stress measured was about 8,000 psi and occurred both at the center of the panel immediately under the car shake-out and

at the juncture of the top member where t joined the car sides, which was also mmediately under the car shake-out. A comparison of the performance of this aluminum car with that of welded steel opper cars, tested under similar conditions, showed that aluminum performed as well, or better, than steel.

The covered aluminum hopper car sed in the static test was not designed rignally for shake-out, but was adapted to receive the car shaker. From a comparison of the performance of the overed car with that of the open car, it ppears that a design incorporating fewer and lighter side posts—giving larger and less rigid panels—would produce a car having excellent fatigue life under shake-out conditions.

Impact Tests

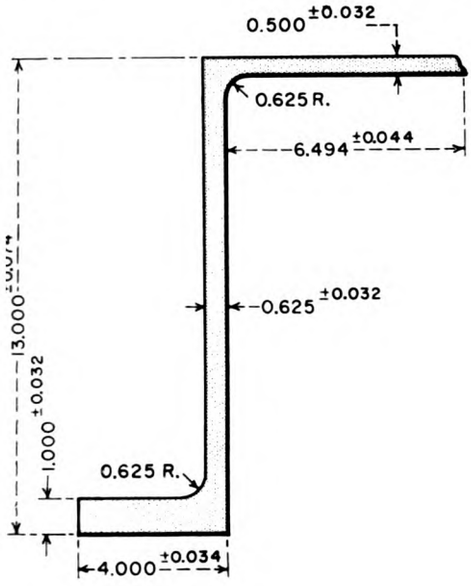
Final tests in this program were designed primarily to determine the effect of impact forces of up to a million pounds on the welded aluminum center sill. The distribution of the stresses throughout the sill and body was also studied. This was necessary to prove that the welded aluminum center sill would meet the published requirements of the AAR and would withstand severe impact loads as well as standard steel center sills.

The covered hopper car was used as the test car filled with crushed rock to give an "on the rail" weight of 168,000 lb. The R&S open hopper car was used as the strike car. It has a standard AAR type steel center sill and was loaded with sand to give an "on the rail" weight of approximately 200,000 lb.

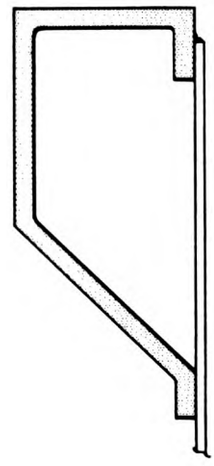
The standard Type E couplers were removed from the striking ends of the

(*Continued on page 36*)

Hoppers Are Aluminum Alloy Above the Trucks . . .



Cross sectional area of two of these sections welded into a sill is 29.77 sq in. Weight per lineal foot of assembly is 34.93 lb.



Special box-type extrusion is used for the side plate on these Roberval & Saguenay car. Relation of this section to side sheet is shown.

Aluminum Alloys Used in R&S Hopper Cars

Alcan 65S-T6 structural shapes
Heat treatable magnesium sillicide alloy
3 x 3 x ⅜-in. angle: end posts
5 x 3½ x 7/16-in. angle: corner posts, diagonal braces, end floor reinforcements, end posts, end plates, end sills, side sills.
Alcan die 31641 "T" section: side posts
Alcan die 70976 side plate: side plates
Alcan die 34073 "Z" section: center sill

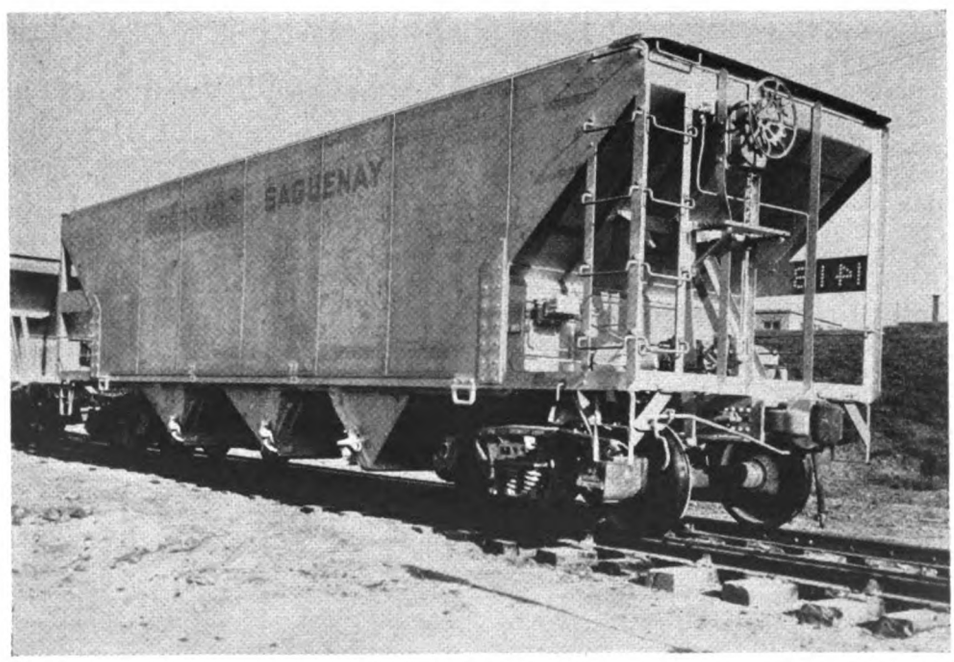
Alcan B54-H11 plates
Non-heat-treatable alloy with 4.5% magnesium
¼-in. plate: hopper doors
5/16-in. plate: bolster reinforcements, corner gussets, floor sheets, hoppers, longitudinal hoods, side sheets
⅝-in. plate: draft-gear carriers
¾-in. plate: crossbearers, bolster gussets, side braces

Alcan 26S-T6 forging
12½ x 8⅞ x 2¼-in. draft gear followers

Alcan 56S welding wire

..Conventional Specialties Are Used on These ars

- Westinghouse ABEL air-brake equipment
- Creco No. 18 brake beams
- Schaefer brake-beam hangers
- Ajax non-spin hand brake
- Apex brake step
- Wine hopper door frames
- Wine door operating mechanisms
- Miner A22-XL draft gears
- Symington journal box lids
- Redipak journal lubricators
- Standard car truck S-2A spring-plankless trucks with Barber stabilizing feature
- Imperial rotary-release uncoupling gear



Aluminum from trucks up, car weighs 32,500 lb, is 38-ft 6-in. between pulling faces, and has a load limit of 177,500 lb. Variation between light and loaded weight necessitates Westinghouse empty-load brakes.

Highlights of ICC Annual Reports

"There was encouraging progress during the year in railroad efforts to improve service and operating efficiency." That's how the 71st Annual Report of the Interstate Commerce Commission summarized progress through fiscal 1957 which ended last June 30th.

Commission comments on advances in locomotives, cars and shops were among those covered. Among ICC legislative recommendations in this report were two of special interest to mechanical officers.

Separate reports of two sections of the ICC Bureau of Safety and Service indicate items which will receive particular attention from ICC inspectors. These are summarized separately.

When it came to railroad progress the Commission's general report took up five topics important to mechanical men.

Journals and Bearings "Railroad freight service will never be as fast and reliable as it should be until the hot box problem has been eliminated. Besides being by far the greatest basic cause of derailments (mainly due to burned off axles from past or present hot boxes), the hot box is a prime cause of delays in service. Many feel that no permanent solution is possible until there is universal adoption of roller bearings on freight cars."

Freight Cars "Several improvements in freight cars, well along toward universal adoption, include steel wheels, snubbing devices in the trucks, retainers to prevent loose waste in standard journal boxes, unit brake beams, nonspin handbrakes, strong steel alloys, and welded construction in car bodies. Steps have been taken by the AAR to make some of these changes mandatory. Other improvements, not being adopted too rapidly although considered by many to be advantageous, include cushion underframes, nailable steel floors, wide doors, brake slack adjusters, rubber draft gears, tight-lock (Type F) couplers, and load separation devices."

Shops "Some large railroads have centralized all heavy freight car repairs in a single, modern shop to reduce costs, lower the unserviceable car ratio, and raise the standard of maintenance, by concentrating work so the volume will justify the most productive machinery and permit assembly-line methods. The idea has been applied by some railroads to locomotive repairs and to wheel and axle work."

Locomotives "The conversion of American railroads to diesel-electric motive power to the virtual elimination of the steam locomotive, is now in sight. This has been one of the most rapid and costly changeovers in railroad history. A recent development in this con-

(*Continued on page*

Locomotives Are In Better Condition

Increases in travel allotments have permitted district ICC locomotive inspectors to give more attention to outlying points in their territories recently. According to John A. Hall, ICC's director of locomotive inspection, "Improved maintenance as a result of this more general coverage is reflected by an increase in the number of locomotives inspected, and a decrease both in the number of locomotives found defective and the number ordered out of service during the year ended June 30, 1957."

Locomotives inspected during that period increased 3.4 per cent over the preceding year. The number of locomotives found defective decreased 10.9 per cent; number ordered out of service for repairs decreased 19.6 per cent.

"During the year," the director continued, "the 65 inspection districts were divided into nine separate supervisory zones and a supervisory inspector appointed to each zone for the purpose of co-ordinating the work of district inspectors, training of field employees, and supervising the technical work in the field. This has resulted in improvement in the program for maintaining uniform inspection practices and enforcement procedures."

In the Forty-Sixth Annual Report by the Director of Locomotive Inspection, Mr. Hall credited "dissemination of pertinent information concerning fundamental causes of locomotive accidents and resultant casualties . . . an important adjunct to basic enforcement activities. Such public information combined with the active enforcement of the requirements has been effective in promotion of locomotive safety and has resulted in a decreasing accident trend."

Seventy-five accidents occurred in connection with all types of locomotives injuring 90 persons. Compared with the preceding year, there was a decrease of four deaths, an increase of two accidents and an increase of eleven injured.

Of the 75 accidents which occurred during the year ended June 30, 195[illegible] 23 were caused by the defective condition of floors, steps, and passageways of diesel-electric locomotives. Fifteen of the 23 accidents were caused by the accumulation of oil on these walking surfaces. In 10 of these 15 accidents

Where Are ICC Defects Being Found on Diesel and Electric Locomotives?

(Partial List of Defects)

	1957	1956	1955	195[illegible]
Air compressors	328	443	419	
Boilers	208	275	203	
Brake equipment	2,906	3,259	2,790	
Cabs and cab windows	1,030	1,600	1,073	
Cab floors, aprons and deck plates	1,940	1,933	1,677	
Controllers, relays, circuit breakers, magnet valves, and switch groups	360	775	802	
Coupling and uncoupling devices	116	166	204	
Draft gear	253	360	336	
Driving boxes, shoes, and wedges	154	291	249	
Fuel system	2,431	2,555	1,833	
Gages or fittings, air	289	278	226	
Handholds	208	258	219	
Internal-combustion engine defects, parts and appurtenances	5,174	6,356	5,035	
Jumpers and cable connectors	442	553	214	
Motors and generators	671	1,122	880	
Sanders	2,023	2,307	1,492	
Springs and spring rigging, driving and truck	370	363	306	
Steps, footboards	827	1,005	737	
Trucks	552	1,007	1,054	
Wheels	256	252	282	

ccumulations were reported from four
› forty-one times during the thirty days
receding the accidents. The number of
ccidents caused by the accumulation of
il on walking surfaces during the year
nded June 30, 1957, decreased 25 per
ent from the preceding year.

Three accidents were caused by de-
ctive condition of cab seats. Four ac-
idents were caused by crankcase explo-
ons which resulted in the injury of
›ur persons. Three of these explosions
sulted from the overheating of bear-
gs, and one resulted from a defective
iston. Items having a bearing on the
efective condition of this piston were
ported forty-four times in the thirty
ays prior to the accident. In 1956 there
ere seven crankcase explosions causing
juries.

Accidents and Resulting Casualties Caused by All Locomotive Failures

	1957	1956	1955	1954
Accidents Resulting in Casualties	75	73	83	105
Casualties: Killed and injured				
Train crew members	76	79	80	95
Maintenance employees	0	2	5	14
Other employees	2	2	18	2
Non-employees	12	0	42	194
Total	90	83	145	305
Fatalities in above total	0	4	3	3

How Frequently Do ICC Inspectors Find Defects on Diesel and Electric Locomotives?

	1957	1956	1955	1954
Number of defects	23,373	29,054	22,618	19,640
Locomotive units reported	30,740	29,405	28,100	27,135
Locomotive units inspected	93,187	88,269	85,897	83,338
Locomotive units defective	9,031	9,597	8,129	7,395
Percentage of inspected found defective	9.7	10.9	9.5	8.9
Locomotive units ordered out of service	417	492	127	140

ider Coverage By Safety Section Inspectors

With increased travel appropriation
r fiscal 1957, agents of the Section of
ailroad Safety, ICC Bureau of Safety
id Service, were more thoroughly able
cover their assigned territories outside
headquarters. Safety appliance agents
›rked 8,853 days away from head-
iarters during this fiscal year as com-
red with 5,105 days during the pre-
ding fiscal year. As a result, inspec-
›ns were made at 1,685 points which
ey found impossible to inspect the
evious year. All this was revealed in
e report of the Section of Railroad
fety to the Commission.

A total of 1,059,689 freight cars were
spected; 60,247 of these had defective
fety appliances, and 71,951 defects
re reported. There were 31,756 pas-
nger-train cars inspected; 1,327 of
ese had defective safety appliances,
d 1,567 defects were reported. A
al of 13,391 locomotives were in-
ected; 411 of these had defective
ety appliances, and 564 defects were
›orted. The total number of cars and
›motives inspected was 1,104,836.
spections were conducted on 318 dif-
ent railroads.

During the year, air-brake tests were
de on 2,246 trains on 138 railroads
or to departure from terminals. A
al of 7,051 or 6.7 per cent, of the
5,324 cars were found with defective
brakes. After these defects were
led to the attention of carriers by
C agents, 2,905 of the cars found with
fective brakes were set out and the
naining 4,146 cars had their brakes
›aired in the trains. As a result of ICC
brake inspections, 105,234, or 99.9
cent of the cars departed with
operative brakes.

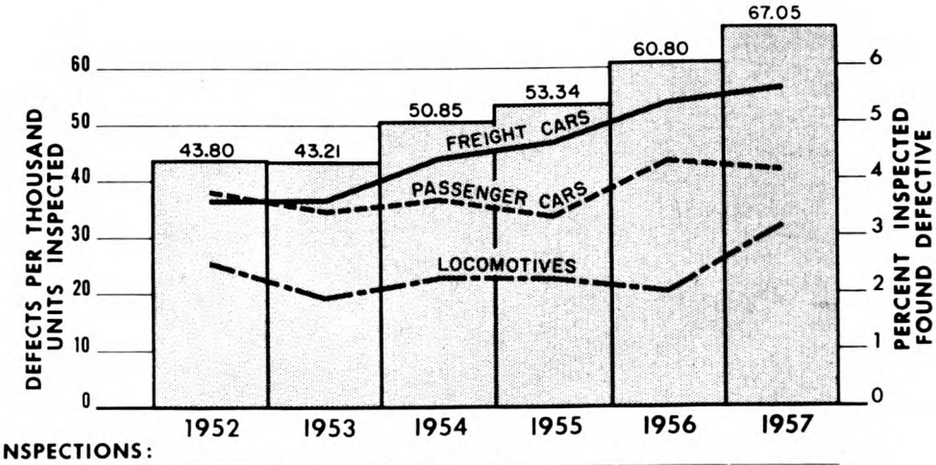
These trains had been prepared for departure, yet when afterward tested by ICC agents, it was necessary to set out cars, or repair the brakes on an average of 3.14 cars per train. A total of 4,967 cars with excessive piston travel were found. Had these trains departed prior to inspection by the Commission's agents, the percentage of operative brakes would have been only 93.3.

Air Brake Tests

Air-brake tests were made on 1,342 trains on 105 roads upon arrival at terminals. Brakes on 84,037 cars (97.8 per cent) were operative. Of those brakes considered operative, 6,956, or 8.09 per cent, were of impaired efficiency due to excessive piston travel. In the 1,342 trains tested, 1,907 cars—an average of 1.4 cars per train—were not controlled by power brakes. Among these were 250 with brakes cut out, and 1,657 with brakes not operating.

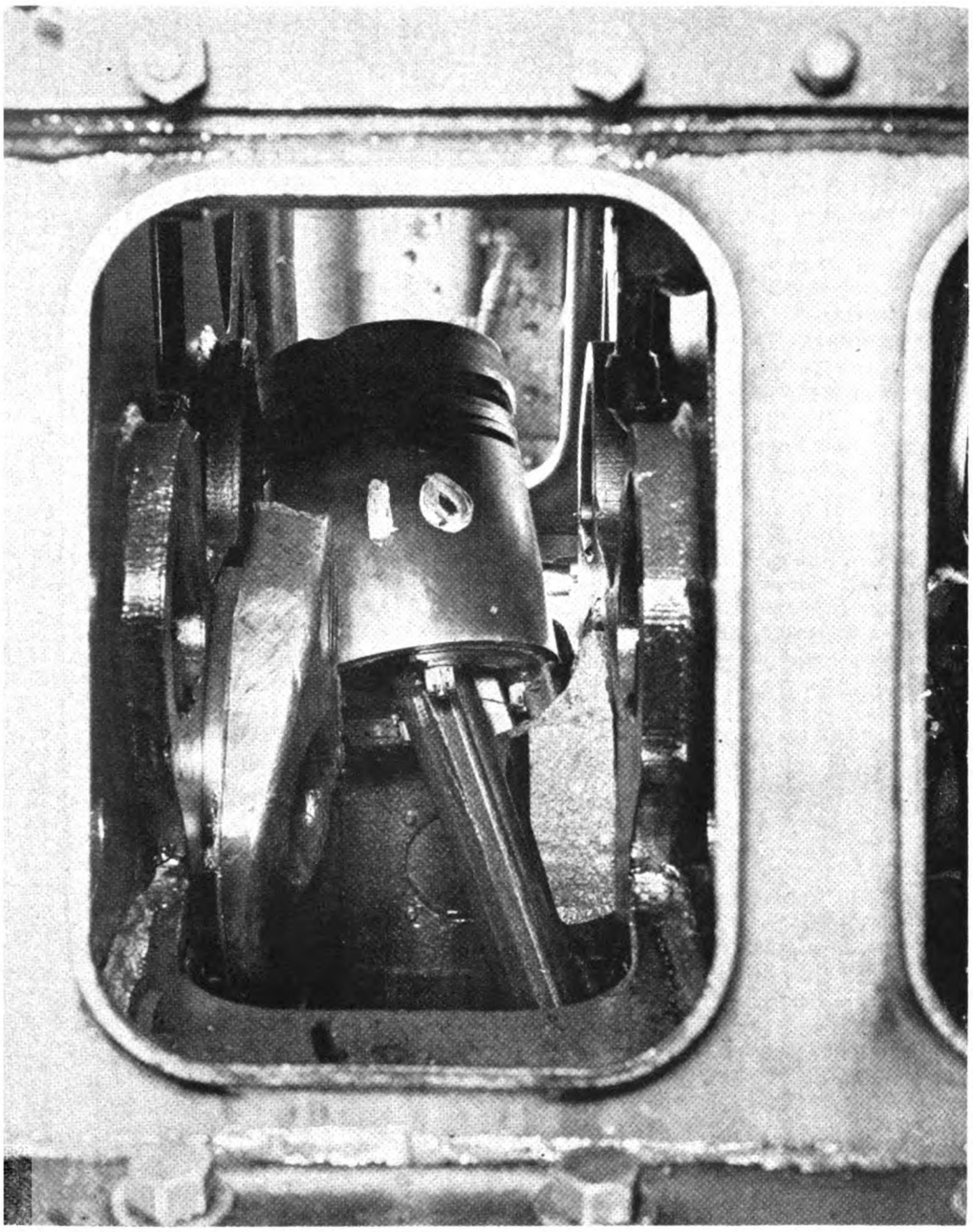
The average consist of trains tested prior to departure from terminals was 48.3 cars, an increase of 0.9 car per train as compared with the preceding year. The average consist of trains tested on arrival at terminals was 64.0 cars, an increase over last year of 2.9 cars per train.

During the year, 100 complaints were investigated, compared with 61 for the preceding year; 52 involved power brakes and 48 involved other safety appliances. In 36 of these investigations, evidence of violation of law was obtained and prosecution on 256 counts was instituted.



INSPECTIONS:

	1952	1953	1954	1955	1956	1957
FREIGHT CARS	1,185,675	1,253,590	1,347,710	1,208,586	1,157,816	1,059,689
PASSENGER CARS	29,079	38,115	42,342	41,040	39,953	31,756
LOCOMOTIVES	13,184	14,303	15,741	14,177	13,797	13,391

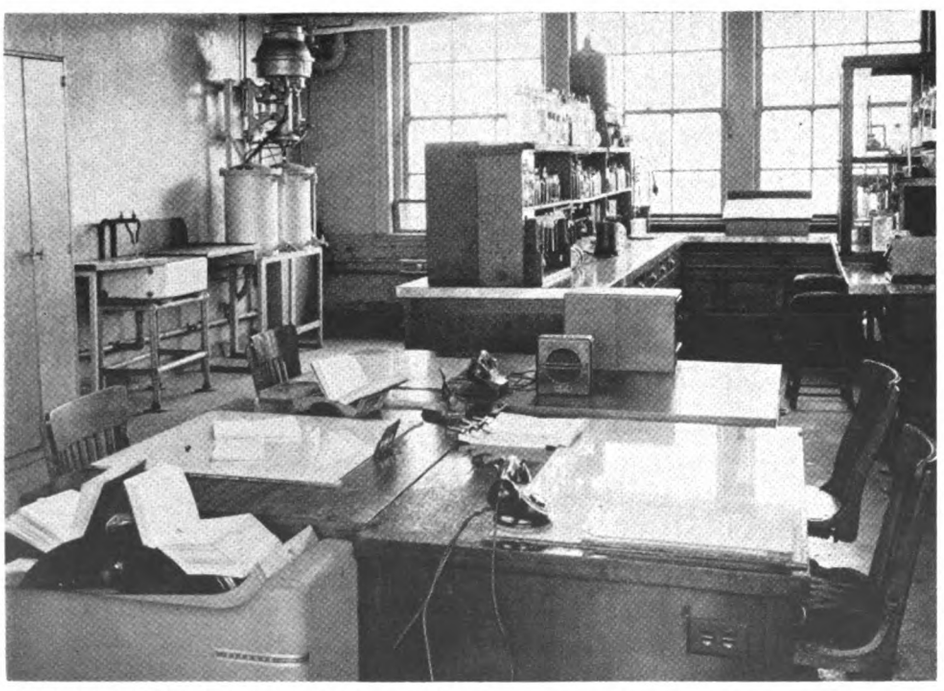


CRANKSHAFT FAILURES such as this one have been greatly reduced by Pennsy's regular spectrographic analysis of oil samples from crankcases. It detects bad bearing conditions which cause broken crankshafts.

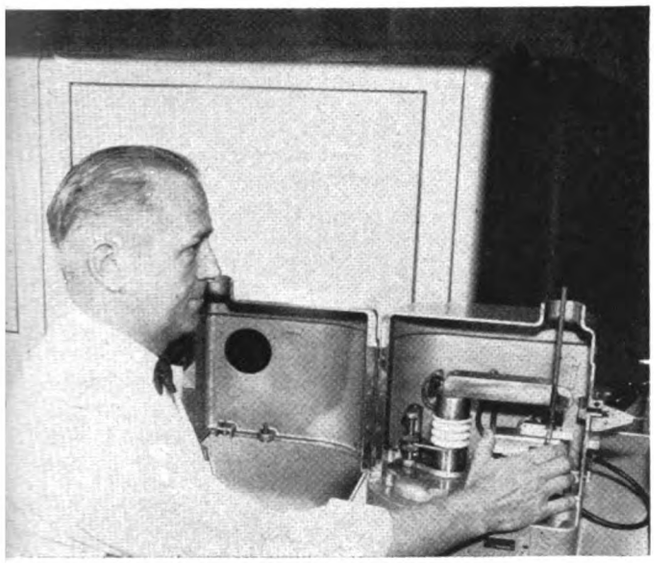
Pennsy Checks Its Lubricating Oil

The program of spectrographic analysis operated by the test department of the Pennsylvania attempts to reduce engine failures and prolong life of parts through a reduction in their wear rates. It is only one part of an overall program which also involves additional laboratory tests other than spectrographic analysis. The samples of lubricating oil from the crankcases of Pennsy diesels are the basis for the entire operation. These samples are taken each two weeks at enginehouses to which the units are assigned. They are checked locally for indications of water or fuel dilution and are then sent to Altoona for the complete examination.

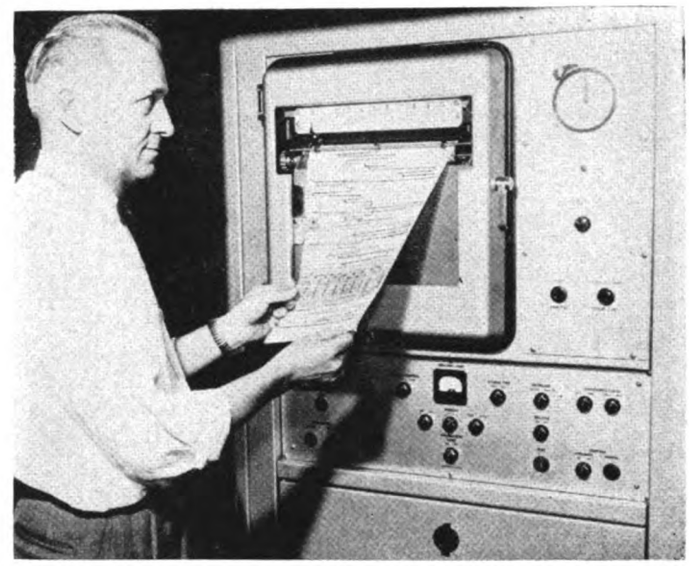
In an operating diesel engine certain wear takes place which deposits minute particles of the wearing metals in the lubricating oil. The Pennsylvania has recently installed a Quantometer in the test department laboratory at Altoona. It can detect as little as one or two parts per million of a gram of metal, and automatically records the amount found. According to M. A. Pinney, Engineer of Tests, the practice of checking Pennsy locomotive oil samples for wear metals is not new, but the Quantometer does permit a marked speed up and improvement in this detection. Samples from each road diesel locomotive are sent to the Altoona laboratories where an average of 130 samples are being tested each week day.



LABORATORY RECORDS of test results and diesel units are kept here. Technicians can tell if samples are coming in from each crankcase and if reported defects have been followed up.



UMINUM CHAMBER containing sample of used diesel engine lubricating is inserted between electrodes of Quantometer by Chemical Laboratory eman E. G. Wertz in Pennsylvania test labortories at Altoona, Pa., to ck rate of locomotive engine wear indicated by small quantities of metal the oil.



GRAPHIC RECORD automatically prepared by this electronic device shows rate of locomotive engine wear indicated by small quantities of metal it detects and counts in used diesel engine lubricating oil. Chart rolls out of recording unit two minutes after oil sample is inserted between two electrodes.

Vear in engine and need for filter changes can be determined by regular spec-rographic analysis; Altoona laboratory's new Quantometer is doing this job.

Until the new device was installed, it as necessary to burn each oil sample wn to an ash and place this ash in an ctric arc between two electrodes. The ectrum of light from the arc, which ntained wave lengths characteristic of y metals present in the ash, was then corded on a photographic plate by eans of a spectrograph. Finally, the ectrum image thus obtained was meas-ed with a densitometer to determine e quantity of each of the wear metals ntained in the sample. This process quired about five hours to complete. If sults were inconclusive in any given st, it had to be re-run in its entirety.

"In the new device," Mr. Pinney id, "the oil sample is burned directly an electric arc and variations in the ght produce corresponding changes in e voltage output of an electronic cir-uit governing the movement of a re-rding stylus." Within two minutes the vice determines the metal content of e oil, and then writes its own report.

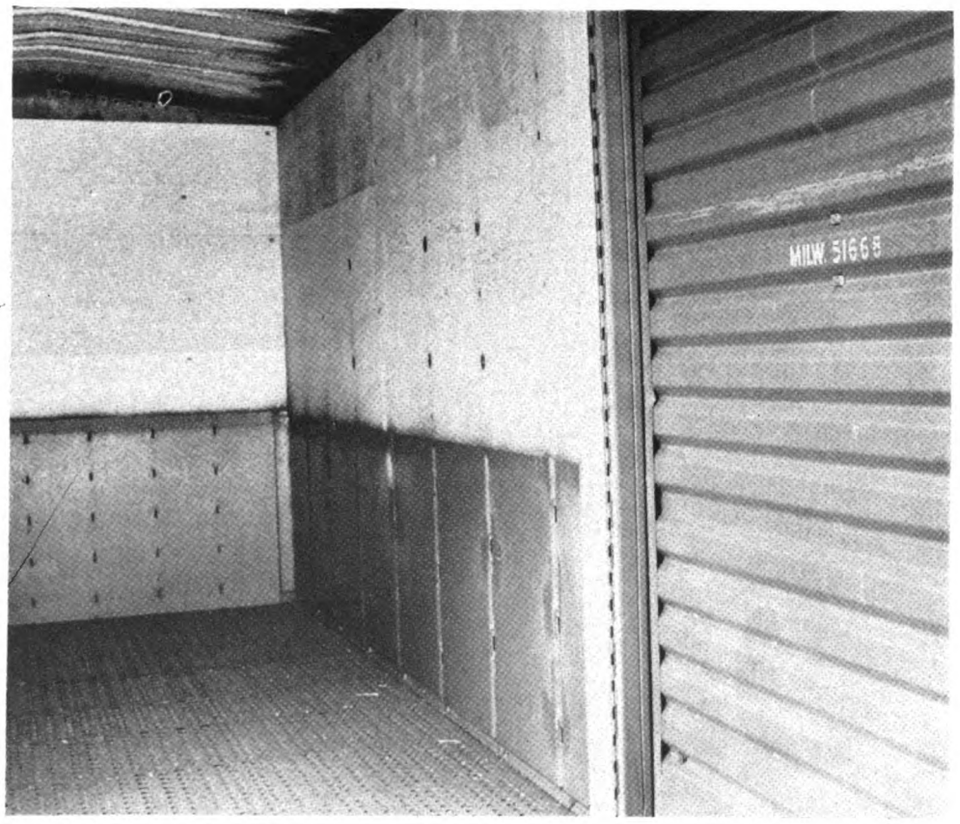
From the word "spectrum" the spec-ograph gets its name. It is an instru-ent for measuring the wave lengths of adiation from elements when burned in 1 electric arc. As each metal burns nitting spectral lines of its own char-teristic wave lengths, the determina-on that a particular spectral line at a ecific wave length is given off during ie burning of a sample is evidence that ie metal associated with that wave length is present in the sample. Metals in burning produce more than one characteristic spectral line and some metals produce many. However, each element always produces the same spectral lines and for convenience the strongest line with a definite wave length is selected for quantitative work. Amazingly minute quantities of an element are sufficient to make its characteristic lines appear. Quantities less than one part per million not only make the lines appear, but give them enough intensity that their wave lengths can be measured and used as a means of determining the quantity of the element present.

The elements which the PRR considers important are silver, aluminum, chromium, copper, iron, lead, silicon and boron. The silver can come only from the wrist pin bushings in one type of engine. The aluminum may come from road dirt drawn into the engine with combustion air, but is most likely to come from aluminum pistons. Chromium comes from chrome plated liners. Copper and lead may come from a number of parts such as brass bushings or camshaft bearings, but are most likely to come from the main and connecting rod bearings. Usually high copper without high lead is indicative of wear on brass or bronze bushings or thrust bearings. High lead, without copper, is usually associated with wear from lead overlay when new bearings are put into service.

Both high copper and high lead indicate excessive wear in the copper-lead bearing metal of crankshaft bearings. Iron can come from plain iron liners, pistons (in one type of engine), piston rings, gears or crankshafts. High silicon is usually an indication of road dirt getting into the engine as a result of improper filtration of the combustion air by engine air filters, and probably indicates inadequate air filter maintenance. Boron indicates cooling water leaking into the lubricating oil because the Pennsy uses a boron type water treatment.

It is the job of the spectrographic laboratory to suggest the parts of the engine which may be wearing excessively and to recommend corrective action to prevent an engine failure. The spectrograph indicates only what elements are present and the amounts in the lube oil sample. It cannot predict whether the copper detected comes from main bearings, from gear bushings, or from valve rocker bushings, etc. Reports suggesting corrective action are sent out by the test department. These report forms provide space for reporting by the engine terminal people what was found, and what corrective action was taken. Data from these returned reports does much to increase the accuracy of prediction by the Spectrographic laboratory.

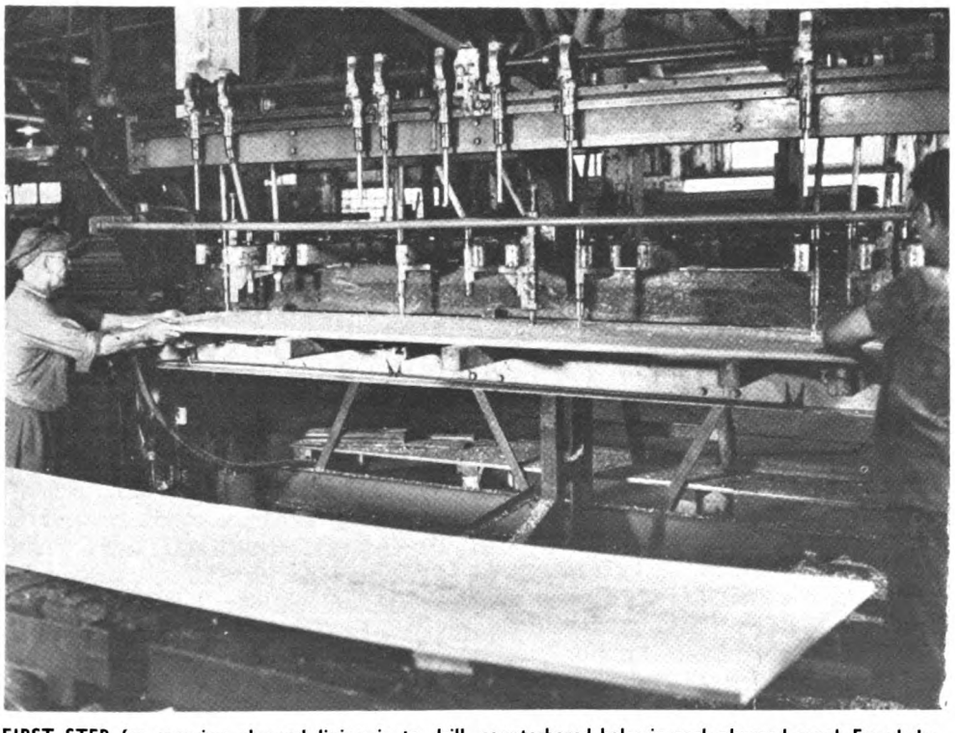
(*Continued on page 33*)



PLYWOOD LINING on Milwaukee box car is secured by end-welded studs and special nuts. Steel linings on lower sides and ends incorporate lading anchors of type different from those used in plywood. Perforated protection plates cover the floor.

On Milwaukee and Reading Cars . . .

ACF Cuts Plywood Lining Cost 7 Per Cent



FIRST STEP for securing plywood lining is to drill counterbored holes in each plywood panel. Four holes are being drilled simultaneously. This technique was first used recently by ACF on 1,400 cars.

A technique for securing plywood lining in box cars, first used recently by the American Car & Foundry Division of ACF Industries, has overcome three barriers to wider use of this lining material.

Plywood was installed on a competitive cost basis with tongue-and-groove siding. The plywood, thus secured, eliminates the possibility of lining theft. It can be easily and economically removed in the repair shop and reused when the steel sides of the cars require maintenance. The fastening method, developed around Nelson end-welded studs and special nuts, made all this possible.

ACF officers estimated that in one 1,000-car lot for the Milwaukee costs-per-car for installing the plywood lining with stud welding were reduced seven per cent, compared with costs for nailing plywood siding to furring strips.

At ACF's St. Louis and Berwick car-building shops, studs to secure side linings were end-welded through predrilled holes in the plywood to the inside faces of car Z-section side posts. One man in each quarter section of a car welded 45

tuds at a net production rate of three ıer minute. Studs to secure the lining on ıoth ends of a car were similarly ap-ılied. They were welded to the crowns ıf the car-end corrugations.

A total of 180 Nelson granular-flux-ılled studs, ⅜-in. in diameter and ⅞-in. ɔng, were used to secure side linings for ach of 1,400 cars in which ACF used he new technique. Sixty studs were ıeeded to fasten each car's end linings.

At its St. Louis shop, ACF installed ılywood linings with this new technique n 1,000 cars for the Milwaukee. The ame method was used on 400 cars for he Reading at ACF's Berwick shop.

low Lining Is Applied

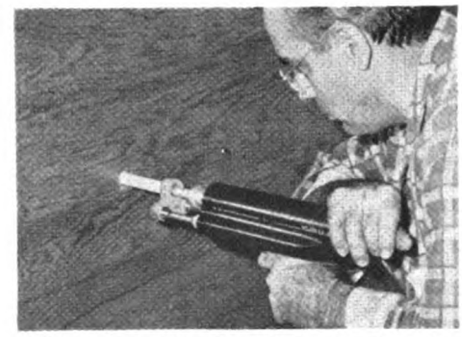
First step in the new procedure was o drill four counterbored holes simulta-ıeously in each plywood side panel, ısing a multiple head drilling fixture. The panels were then placed in position ınd held temporarily with cross bracing. After studs had been end-welded, hrough the holes, Nelson flush-type ning nuts were run down on the studs vith a power wrench.

The nuts, with tapered threads that will not work loose in service, were secured at an average rate of four per minute. They finished flush with the face of the car lining.

To provide added protection against theft of panels, a few nuts were securely fastened to the ends of studs with small tack welds. When it is desired to remove the plywood temporarily during car maintenance, these nuts can be freed by removing the weld metal with a small hand grinder.

Besides being more difficult for potential thieves to remove than nailed-down plywood, panels installed in this way will be less desirable to vandals because of the predrilled holes. For maintenance, however, they can be removed easily and reinstalled without damage.

ACF also used Nelson end-welded studs to speed production and reduce cost in other applications during construction of the cars. These included securing the wood flooring shims with 16 no-thread studs; fastening ownership plates with four studs each, and fastening the air-pipe bracket with a single stud.



STUDS are end-welded through pre-drilled counterbored holes to side posts while plywood sheets are temporarily braced in position. Plywood lining is secured by special nuts on studs. Nuts run down flush with plywood surface in counterbored holes. Large holes in plywood accommodate lading strap anchors.

ennsylvania Makes Regular Lube Oil Examinations

Continued from page 31)

The laboratory, beginning in Feb-uary, 1954, took under control 102 aldwin freight units. Since then all oad and road switcher units of 1,500 p and over have been placed under pectrographic control. However, in ebruary and March, 1954, there were 51 oil samples received and analyzed rom these 102 units. Forty six (18.3 er cent) of these were found to give alues indicative of improper conditions ı the engines as follows: 2 showing fuel il dilution, 28 showing bearing defects, 2 indicating water leaks, and six of the ils showing more than one improper ondition. Bearing inspections were re-uested for 27 engines and on 24 of ıese defective bearings were found. In ıese engines 221 connecting rod and 49 main bearing halves were renewed. he lab continued to point out bad ngine conditions, particularly cooling ater leaks. Six months later during July nd August, 1954, the 357 samples from ıese Baldwin units produced only 25 amples indicating improper conditions. hese were six cases of fuel oil dilution, ıree cases of high lead, five cases of xcessive road dirt in the oil, and six ases of cooling water leaks. Only three earing examinations were requested nd two of these showed no defects. he third engine needed renewal of only one bearing half.

The Pennsylvania has attempted to stress that this program is a joint endeavor by both the test department and the maintenance forces. A representative oil sample from the crankcase is important. The portion used for the spectrographic analysis represents less than 1 part in 320,000 of the total oil in the crankcase. From this, indications of improper engine conditions are evaluated.

The spectrograph does not indicate copper or any other metal in a sample unless it actually exists. The indication as to the part which is breaking down is based on previous experiences and on the other metals present in the sample. When the spectrograph results indicate that an unusual amount of copper is actually present, then some part in the engine containing this metal must be wearing excessively. If examination of the part indicated by the test department shows no failure, it has proved worth while to extend the inspection to other critical parts containing or causing the presence of this same element. This has been particularly true in the case of water leaks. Many water leaks are intermittent, depending on temperature, and their location is frequently difficult.

Keeping a continuous record of the levels of critical elements has assisted the PRR in extending its scheduled shopping periods by several months. At the present time the road is overhauling about 15 fewer units monthly than would have been required with shopping schedules used prior to the introduction of the spectrographic analysis. However, spectrographic analysis is only part of the overall oil testing program and the remainder will be discussed next month.

Special Flat Cars Popular in 1957

OVER 40 SPECIAL FLAT CARS were ordered in 1957. Among them were ten Chicago & Eastern Illinois depressed-center units assembled at the road's Danville, Ill., shop. General Steel Castings supplied bodies.

PREHEATED CASTING in metal box is covered with powdered asbestos to retain heat for welding.

COMBINED WATER AND AIR PRESSURE reveals leaks which are marked with chalk. Pivoted supporting stand easily lifts valve seats to top.

How MoPac Reclaims Diesel Cylinder Heads

Cracked cylinder heads get specialized attention on a step-by-step production line in the Missouri Pacific's North Little Rock, Ark., shops. This operation is not duplicated in any other MoPac shop. All cracked heads from any locomotive maintained elsewhere on the railroad are shipped to North Little Rock for this reconditioning.

Some twenty-two individual steps are required. A number of accurate machine tools, including boring mills and drill presses, are used along with special jigs and fixtures. Many appliances were shop-made for handling heads during the progress of the job. Redesigned cutting tools greatly expedite the work. An outstanding example is a boring tool which completes over twenty-five heads (four holes each) per day. This operation of boring the four valve seats prior to application of new inserts was formerly done at a rate of four to five heads per day.

Reconditioning begins with chemically cleaning the heads. Shops over the system do their own cleaning before heads are sent in for repairs.

Steps 1 to 3 The first step is accurately locating the crack in the casting which, if left unrepaired, would permit water from the engine cooling system to get inside the cylinder. The head is mounted on a supporting stand, which is pivoted so the head can be turned 180 deg to bring the valve seats to the top. A water test fitting is attached which allows water under high pressure, augmented by the shop air pressure, to flow into water jacket cavities. Where the water emerges from the casting is marked with chalk to define the area where welding is to be done. The valve guides, springs and plates are then disassembled.

COVER PHOTO

Valve seats are rough-bored before welding to insure solid metal around and under the insert. This is actually Step 4 in the process.

Step 4 The valve seats are rough bored before welding. A new oversize diameter of $3\frac{23}{32}$ in. is bored $\frac{3}{16}$ in. deeper than the length of an insert to insure solid metal around and under the insert.

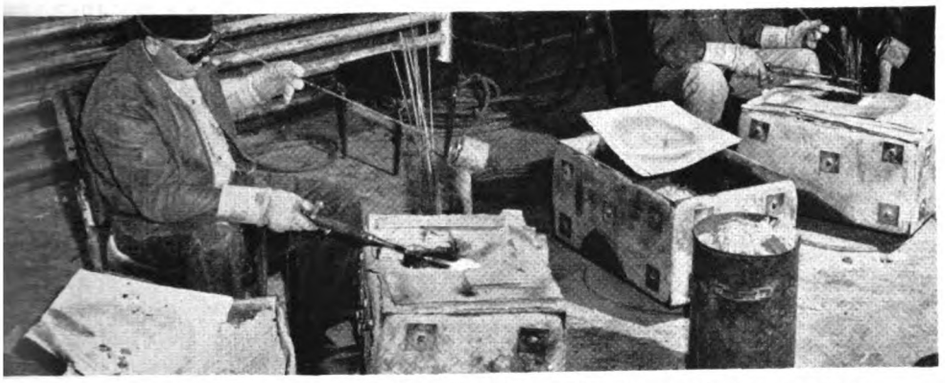
Step 5 The valve guide openings in the casting are packed with cast iron dust to prevent scaling during the heating operation. Chalk marks are replaced with chisel marks.

Step 6 Before welding is begun, the casting is pre-heated for 30 to 40 min in an oil-fired furnace at 1,400 deg F. This insures that the casting will not crack elsewhere when the high temperature of the welding torch is applied.

Step 7 The pre-heated casting is placed in a metal box on a low revolving stand, and is covered with powdered asbestos to retain heat during welding.

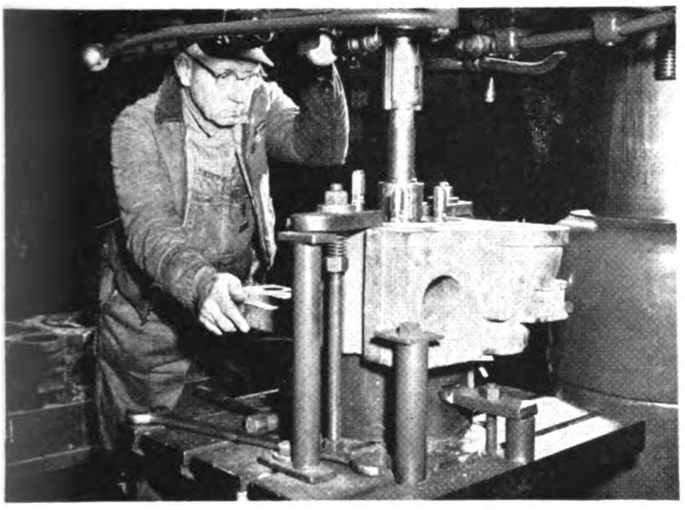
Step 8 The crack is closed by oxyacetylene welding with proper welding rod.

Steps 9 to 11 The cylinder head is returned to the furnace for a normalizing period of one hour at 1,440 deg F, with temperature controlled by an electric pyrometer. The casting is then removed from the furnace and allowed to cool slowly for 48 hours under a covering of flaked asbestos. When completely cooled, the head is removed from the

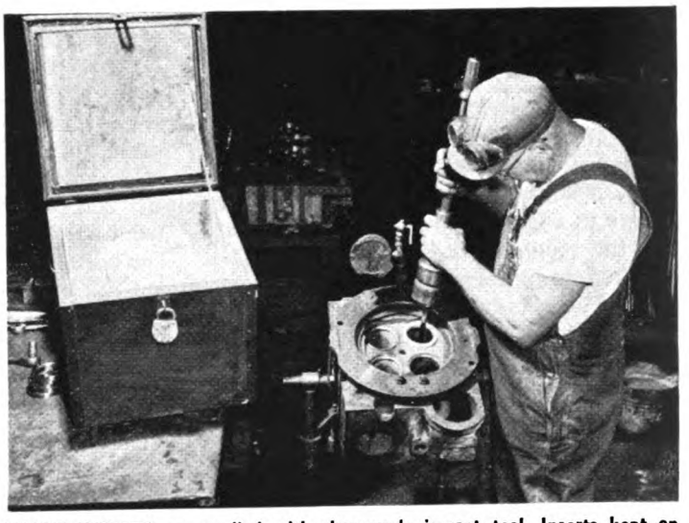


LEAKS ARE REPAIRED by oxyacetylene welding. Revolving stand positions work for easy access.

BORING MILL removes unwanted welding deposits.



RADIAL DRILL with special designed boring tool completes up to 25 heads (four holes each) per day. Previous daily output was four to five per day.



VALVE INSERTS are applied with shop-made impact tool. Inserts kept on dry ice facilitate application and insure tight fit.

box and is blown thoroughly to remove asbestos and the residue of cast iron dust.

Steps 12 and 13 The casting goes to a boring mill to have welding deposits machined from the face of the casting. It then goes to a drill press where the valve seats are rough bored.

Step 14 The head is then returned to the water test jig used in Step 1 to insure (1) that the original crack is properly repaired, (2) that there is no porosity in the weld, and (3) that the first machining operations develop no new leaks. This step saves considerable time in reclamation since any defect at this point will return the head to the start of the reclamation process.

Step 15 This is a hand grinding operation to remove welding slag inside the head. This is done with a die grinder and pneumatic chisel.

Step 16 The new valve guides are inserted in the head by hydraulic pressure.

Step 17 The four insert holes are rough- and finished-bored on the drill press for application of the new size minus 0.003-in. valve inserts.

Step 18 Another water test is given for leaks.

Step 19 The head is now ready for application of the valve inserts, or rings. A supply of these are kept on dry ice to shrink the metal so that expansion under normal temperatures in properly bored castings will make a tight fit. A shop-made impact tool firmly places the insert ring on the bottom of the bored cavity to insure that the seat will not come loose from the impact of the valves.

Step 20 The valve inserts are ground to insure positive closure of the valve during fuel cycles.

Steps 21 and 22 The valves and springs are reassembled into the head which is now ready for the final step. This is hand lapping of the face of the joint on the head to insure a perfect fit between the head and the cylinder liner. With this step completed the reconditioned head can be installed in an engine.

While the 22 operations represent reconditioning of one type of cylinder head, there are variations for those of other types, and for those of other builders. Special conditions sometimes alter this cycle.

HEAD, WITH VALVES AND SPRINGS assembled, will have joint between head and cylinder liner hand-lapped.

Aluminum Sills Take Million Pound Impact

(*Continued from page 27*)

two cars involved in the test. The coupler on the strike car was replaced by a solid steel strike block machined to fit into the coupler pocket, while that on the test car was replaced by a dynamometer.

The impact tests were carried out on grades on a CNR spur line at Kingston. By starting the strike car from various locations on the grade, it was possible to obtain strike velocities from 2 to about 15 mph.

Two series of tests were conducted with friction type draft gear up to an impact force of 935,000 lb. In the first series, the test car was free and did not come in contact with the back-up cars. In the second series, the test car was backed-up by four fully loaded box cars to determine what effect this might have on the stresses in the center sill and car body. A third series of tests was undertaken in which rubber draft gear replaced the friction draft gear in the strike ends of both cars. In this series of tests impact forces of up to 947,000 lb were reached.

Aluminum hopper cars made their first appearance in Canada in 1948. These 30 open-top cars for the R&S were made from Alcan 65S-T6 plate and extrusions, and assembled with Alcan 55S-T6A rivets. The underframe was steel. Between 1949 and 1951, 60 additional cars were built. In 1955 the R&S bought 28 aluminum open-body hopper cars of welded construction. These cars incorporated many new design features.

Early in 1956, 16 all-aluminum covered hopper cars were built for Alumina Jamaica. The cars were of all-welded construction and were the first to incorporate AAR type aluminum center sills.

In 1957, 30 aluminum open-body hopper cars of all-welded construction were built for the R&S. Their design incorporated many of the results of the static and impact tests. They have welded aluminum center sills of the AAR type.

Half the load is carried to the center sill. The center sill is supported by the two bolsters and the two crossbearers. The bolsters carry the load to the trucks and the crossbearers carry the load to the car sides. The other half goes to the car sides which, in turn, are supported by the bolsters.

Standard steel girders for hopper car sides of this type usually have vertical stiffeners at about 3-ft 6-in. intervals. Wider spacing is usually impractical since the panels will flex more readily than small panels and the paint may flake off and eventually rust will accelerate corrosion. Because this does not occur with aluminum, spacing of vertical stiffeners can be increased to about 8 ft making the structure more efficient and entailing considerably less labor in fabrication. A special box-type aluminum extrusion was designed for the side plate and a heavy aluminum extrusion was used for the side sill. In designing the center sill, the eccentricity of the load is taken into account. The welded area, as well as heat-affected zone of the center sill, was not included in the effective net area.

These new cars were built by Canadian Car & Foundry. Aluminum welding technology has made big strides forward since 1950. Satisfactory welds can be made at high speeds with either hand or machine methods, using Alcan's inert metal arc process. In this IMA process the electrode is the filler wire and the arc is shielded by an inert gas, such as argon.

At Cancar's plant, the automatic welding jigs were fitted with the IMA equipment. The sides of the cars are made up of sheets approximately 60 in. wide joined by vertical welds approximately 8 ft long. This job was done on jigs normally used for welding steel car floors. Other automatic jibs were used for assembling the side sill and side plate to the completed side sheets. Remainder of the car was hand welded.

ICC Summarizes 1957 Railroad Progress

(*Continued from page 28*)

try for line-haul service is the direct-drive diesel (brought from Europe, where it is widely used) which eliminates the heavy and costly electric drive. It has been put into use on some of the new streamlined trains. Widespread use of diesel-electric locomotives has caused plans for new electrifications to be dropped, at least for the present.

"Some existing electrifications have been eliminated in favor of diesels, but the remaining mainline electrifications, have recently been re-equipped with new all-electric locomotives, are likely to continue in use for a long time.

"Oil-burning gas turbine locomotives, although produced at present by only one manufacturer and so far used by one railroad (which has 55 in use or on order), may eventually challenge the diesels, especially for long-haul, heavy-duty runs. They have a lower thermal efficiency than the diesels and a relatively high idling fuel consumption, but burn very low-grade oil, and should have a lower maintenance cost because they have fewer moving parts."

Passenger Cars "Most of the lightweight trains have been tested in regular operation to win passenger acceptance of the lighter, more economical, high-speed trains. . . . How well some of them will stand up in long life of use remains to be seen . . . . Trains of this type are of two classes—those made up of cars which can intercouple with, and operate in, trains with conventional equipment; and those which cannot. Before many more of these trains are built, railroad management should decide whether to abandon or retain the flexibility of universal standard coupling of all equipment.

"Trains with all passengers seated at dome height were a daily sellout, and double-deck, gallery-type cars continued popular for commuter service on three railroads. Both types are equipped with standard couplers."

These Two ICC Legislative Recommendations Could Affect Your Operations . .

■ **"We recommend that the Safety Appliance Acts be amended so as to give the Commission authority to prescribe rules, standards, and instructions for the installation, inspection, maintenance, and repair of power or train brakes."** ***(The Commission alleges that the voluntary AAR brake code has not produced results the ICC considers desirable. This recommendation was first made in 1956. Hearings were completed by both Senate and House, and the Senate passed its bill. No further action was taken by the house.)***

■ **"We recommend that the Locomotive Inspection Act be amended so as to eliminate the provisions relating to the appointment of the director and assistant directors of locomotive inspection by the President, and that those positions be placed in the classified service, and, further, that the detailed requirements relating to the duties of the inspectors be eliminated. We also recommend the elimination of the oath requirement in the inspection reports."** ***(This is part of a program to consolidate all railroad equipment inspections in the Bureau of Safety and Service eliminating "artificial separations of work" between several types of inspectors. Action was first recommended in 1954. Committee hearings have been held but no bill ever been reported out of either committee.)***

NEW ARMCO
High Strength Steel Keeps Car Costs Low

Here are two ways Armco High Strength Steel can help trim yearly car costs:

1. **Cars made from this special steel last much longer —stretch original cost over many more years.**
2. **Annual costs stay down because cars made from Armco High Strength Steel need little maintenance.**

Ordinary steel can't match the damage-resisting strength of Armco High Strength Steel. What's more, this durable steel lasts longer in service. It has 4 to 6 times the atmospheric corrosion resistance of ordinary steel.

To make the most of this extra corrosion resistance and higher strength, car builders are using Armco High Strength Steel in the same thicknesses they formerly specified for regular carbon steel. Their aim is longer car life at lower lifetime cost.

To investigate the cost-saving advantages of Armco High Strength Steel, just fill in and mail the coupon or contact the Armco Sales Office near you.

Armco Steel Corporation
2257 Curtis Street, Middletown, Ohio

Send me more information about Armco High Strength Steel.

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____

ARMCO STEEL CORPORATION
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SHEFFIELD DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

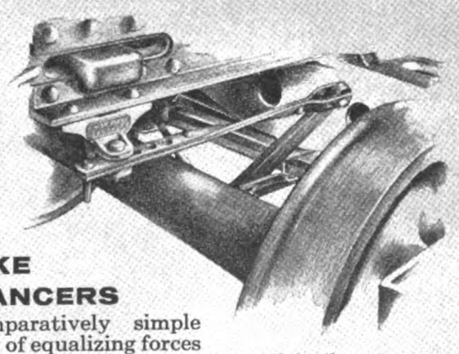
Since 1912

LEADERS IN RAILWAY APPLIANCE PROGRESS

Experienced in Design and Manufacturing of Specialized Products

The nation's railroads are noted for many great transportation achievements . . . one of the most important being the efficient handling of the country's heavy bulk freight.

Since 1912, The Wine Railway Appliance Company has designed and manufactured many of the important parts of hopper, gondola, flat and box cars that make this handling function possible, as well as profitable, for the owners and users of the cars. In the years ahead, Wine will continue, through its experience, engineering know-how, and manufacturing skills, to keep pace with the needs of the railway industry.

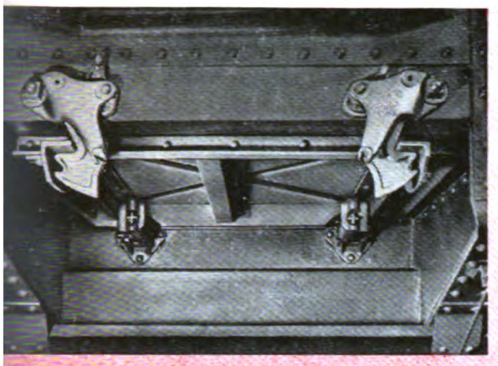


BRAKE BALANCERS

A comparatively simple method of equalizing forces and "balancing" the conventional brake arrangement by replacing the dead lever connection to the truck bolster with the Wine Balancer—connected to the car underframe. A bracket and connector at each end of the center sill flange, engaging the dead lever, balances the brake forces by returning them to the underframe of the car.

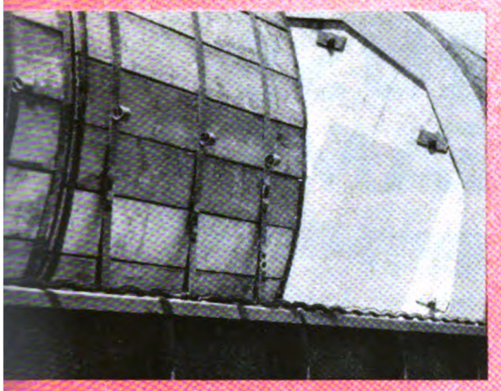
CORRELATED HOPPER UNITS

The one-piece, cast steel frame unitizes each individual hopper into a structurally sound, functional assembly which assures positive door fit. The adjustable locks, cast steel hinges, and symmetrical tapered door flange make possible the *only* adjustable door fit permitting compensation for wear or common irregularities of construction. "Balanced" unloading is assured by dual door operation and a method of controlled flow.



ROP BOTTOM SPRING HINGES ND ADJUSTABLE LOCKS

op Bottom Gondolas equipped with these two ine products provide the shipper and receiver the lading with a positive closure and afford a t, economical one-man operation, with selec- e single or multiple opening of doors.



ONTINUOUS LADING BAND NCHOR

ne's continuous offset bar for top-coping plications provides a secure anchor for lading nds every 7½" of its entire length. Permits the of all types of banding material.

DROP END LOCKS AND END BALANCERS

The *complete* drop end combination from operating and security standpoints! Interlocked corners provide rigidity to keep the sides from spreading under load. The balancer incorporates the hinge function . . . permits a one-man, time and labor saving closure.

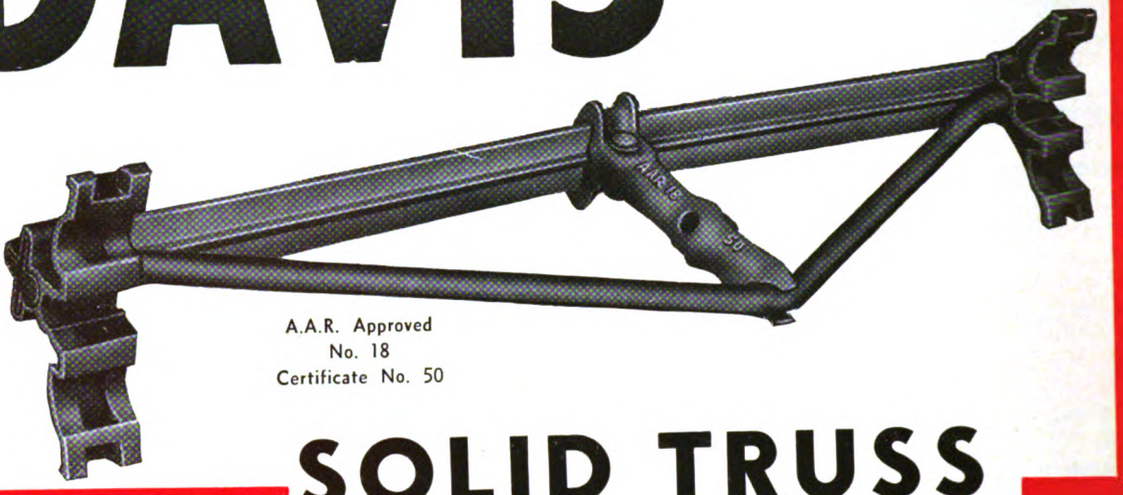
UNIVERSAL LADING BAND ANCHORS

Easily applied on all flat cars and gondolas, the Wine Universal Type Anchor features 360° rotation for tie-ins from any direction. Versatility of use permits welding on coping at important locations as well as mounting in the floor. Drop flush when not in use.

DJUSTABLE HOPPER OOR LOCKS

e adjustment feature allows compensation for nstruction differences and readily permits ad- tments necessitated by wear. Wine Adjustable pper Locks are adaptable to built-up, struc- ral hopper openings as well as cast steel frames.

DAVIS

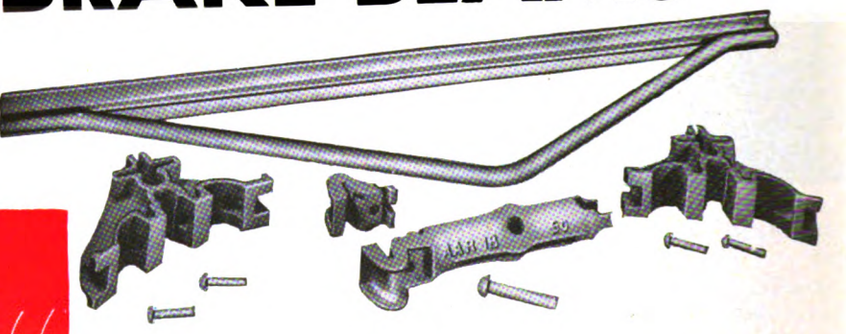


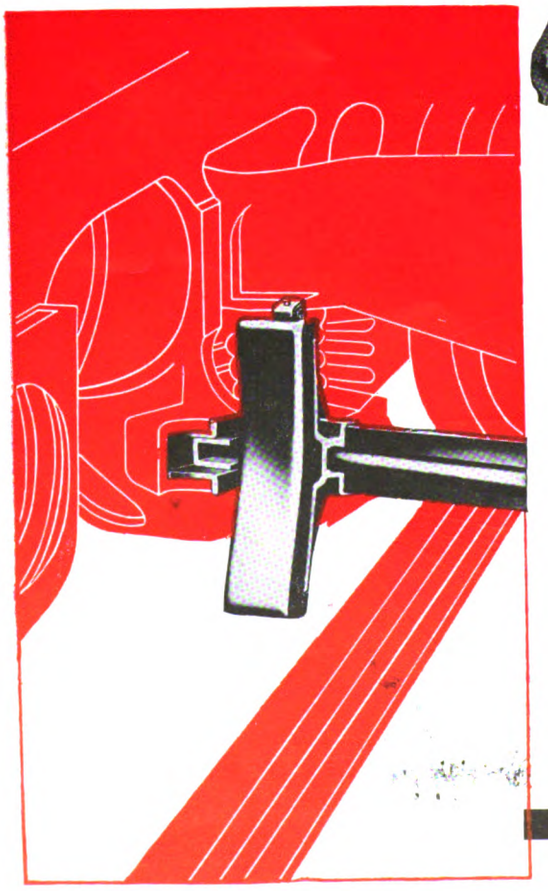
A.A.R. Approved
No. 18
Certificate No. 50

SOLID TRUSS BRAKE BEAMS

A RECOGNIZED STANDARD FOR MORE THAN 30 YEARS

Whether for Conventional Hanging or for UNIT TRUCKS Davis Solid Truss Brake Beams are DECISIVELY SUPERIOR.





ANY PART RENEWABLE

Without Disturbing the Truss!

OTHER IMPORTANT FEATURES:

- One piece FORGED truss
- No Threaded Rods
- Interchangeable Right and Left Brake Heads Are Easily Applied without Dismantling Truss

DAVIS

BRAKE BEAM COMPANY

Plant and General Office—Johnstown, Pa.
Boston • Chicago • Cleveland
Richmond • St. Louis • San Francisco

AB Brake Equipment

Installment 2D

Emergency Application

Accelerated Release After Emergency Application

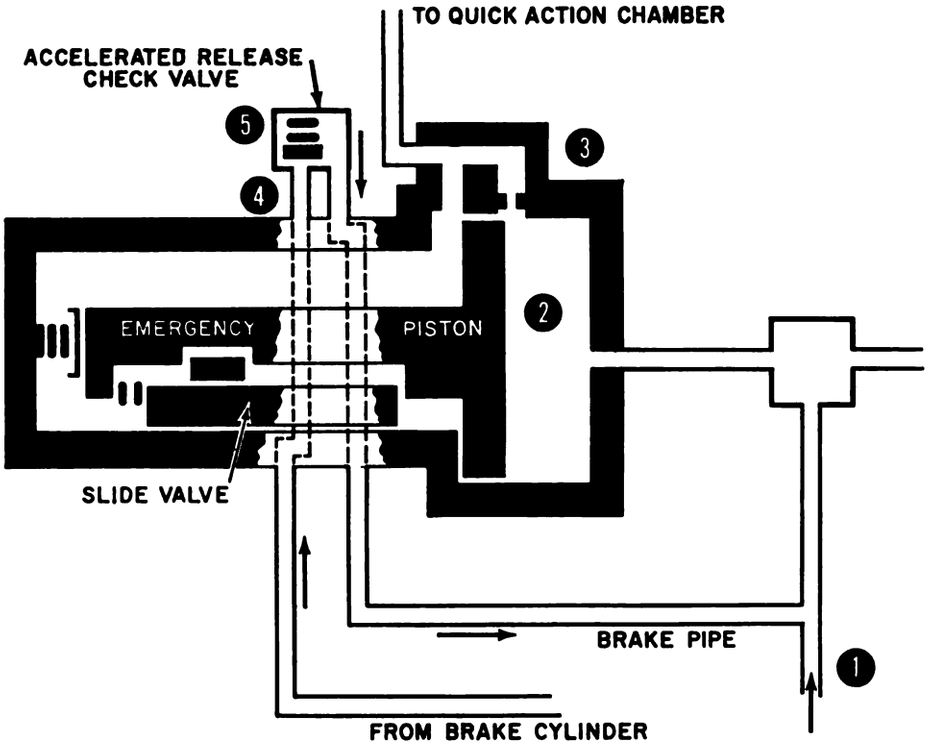
(Sketch 17)

When brake pipe pressure on the face of emergency piston is increased sufficiently after emergency application, the piston moves to the left compressing return spring *137*. The emergency slide valve blanks emergency reservoir port *e3* in the seat which bottles this volume and assures that no further change takes place in emergency reservoir pressure until the service slide valve moves to release and makes connection with the auxiliary reservoir.

Brake cylinder pressure is now connected to the under side of the accelerated release ball check and check valve. Because the auxiliary reservoir and brake cylinder volumes are connected, the pressure of these combined volumes is greater then that of the brake pipe above the checks. The check valves are unseated and permit flow into the brake pipe via passage *b4* until the pressures are within 10 psi of equalization.

This is the fourth installment on the AB Equipment. The first installment and color chart appeared in November, 1956, p 87, the second in January 1957, p 48, and the third in July, 1957, p 49.

In coloring Sketch 17, a heliotrope pencil should be used to color the space at the left of the emergency piston including the short passage marked "to Quick Action Chamber". Dampen and let dry. In pink, color the passage from the brake cylinder to the under side of the accelerated release check valves. From there, color in yellow the brake pipe passages and the space at the right of the emergency piston.



Sketch 17

Emergency Portion Accelerated Release

1. **Brake Pipe pressure is building up.**
2. **It moves Emergency Piston to Accelerated Release position.**
3. **Charging port is opened from Brake Pipe to Quick Action Chamber.**
4. **Emergency Slide Valve connects brake cylinder passage to underside of Accelerated Release Check Valve.**
5. **Check valve is unseated by higher brake cylinder pressure. Brake cylinder pressure feeds into brake pipe.**

Dampen each individual color when completed and let it dry before proceeding.

Completion of Accelerated Release

(Sketch 18)

The Quick Action Chamber is being charged through the charging choke and as soon as the pressure on both sides of the emergency piston become substantially equal, the return spring will move the emergency piston and slide valve from accelerated release to charging position. This slide valve movement blanks port *c9* in the seat and closes the connection between brake cylinder and brake pipe.

Color the space at the left of emergency piston in heliotrope,

stopping at the charging port. Dampen and let dry. From the charging port, with yellow fill in the space at the right of the emergency piston, continue through the brake pipe passages, and end up on top of the accelerated release check valve. Dampen and let dry. With a pink pencil, color the brake cylinder passage *c3* to the point where the slide valve contacts its seat. In pink dashes, color the passage (partly hidden) to the under side of the accelerated release check. Dampen and let dry.

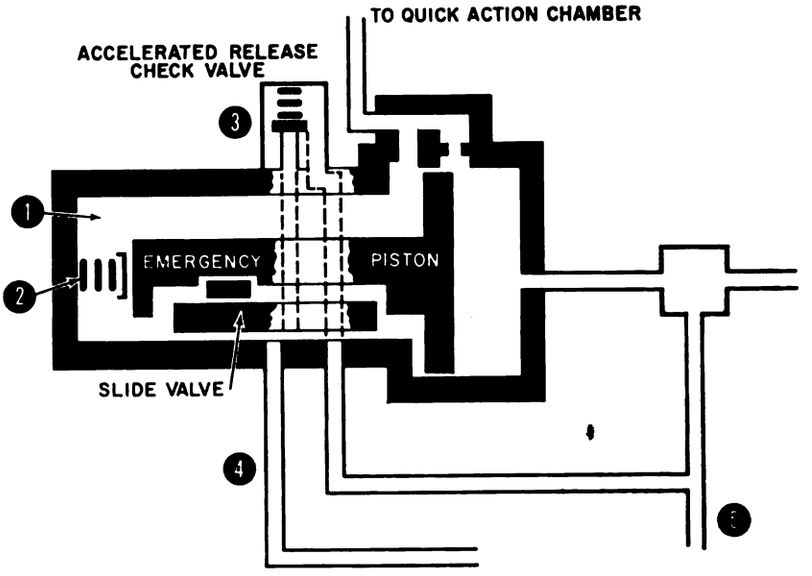
Service Portion Release After Accelerated Release

(Sketch 19)

When brake pipe pressure becomes slightly higher than auxiliary reservoir pressure, the service piston and its slide valve are moved to either retarded recharge or full recharge piston and the brakes will be released and reservoirs recharged as under "Release And Charging Position".

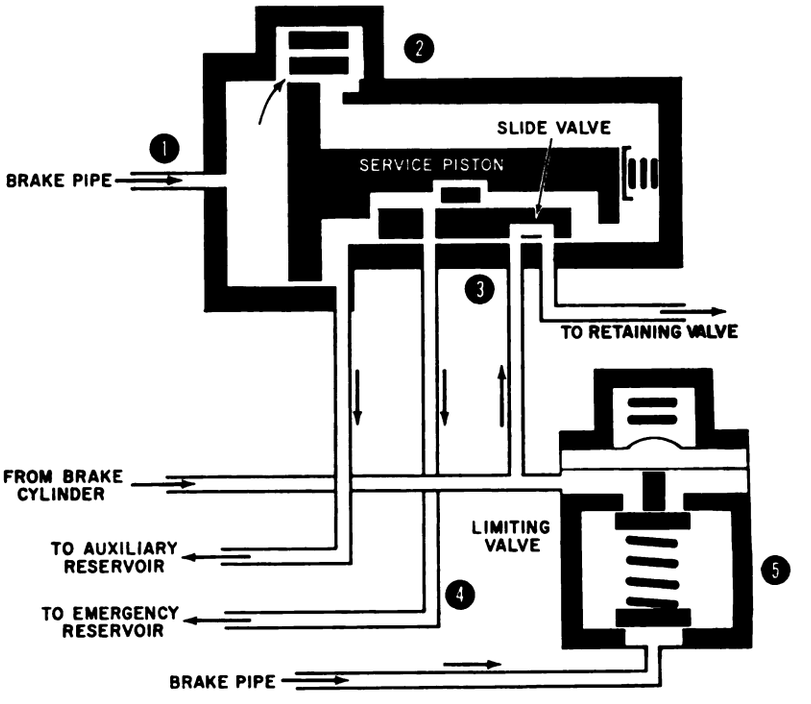
With a yellow pencil, color the space at the left of the service piston and the passage leading into it. Stop the yellow color where the passage enters the space at the right of the piston. From there, color the entire space at the right of the piston, on top of graduating valve and slide valve, and the passage leading to the auxiliary reservoir in dark green. Continue the green color through the port in the slide valve (past the graduating valve) but stop at the point where the slide valve contacts its seat. Dampen each of the above colors as completed and let dry before proceeding.

With an orange pencil and starting from the green at the slide valve seat, color the passage leading to the emergency reservoir. With a pink pencil—in dashes—color the passage from the brake cylinder into the space under the diaphragm in the quick service limiting valve. Continue by coloring the passage into the slide valve cavity, from there to the retaining valve, and to atmosphere. With a yellow pencil, color the space between the two check valves in the quick service limiting valve and its connecting passage.



Sketch 18
Emergency Portion at Completion of Accelerated Release

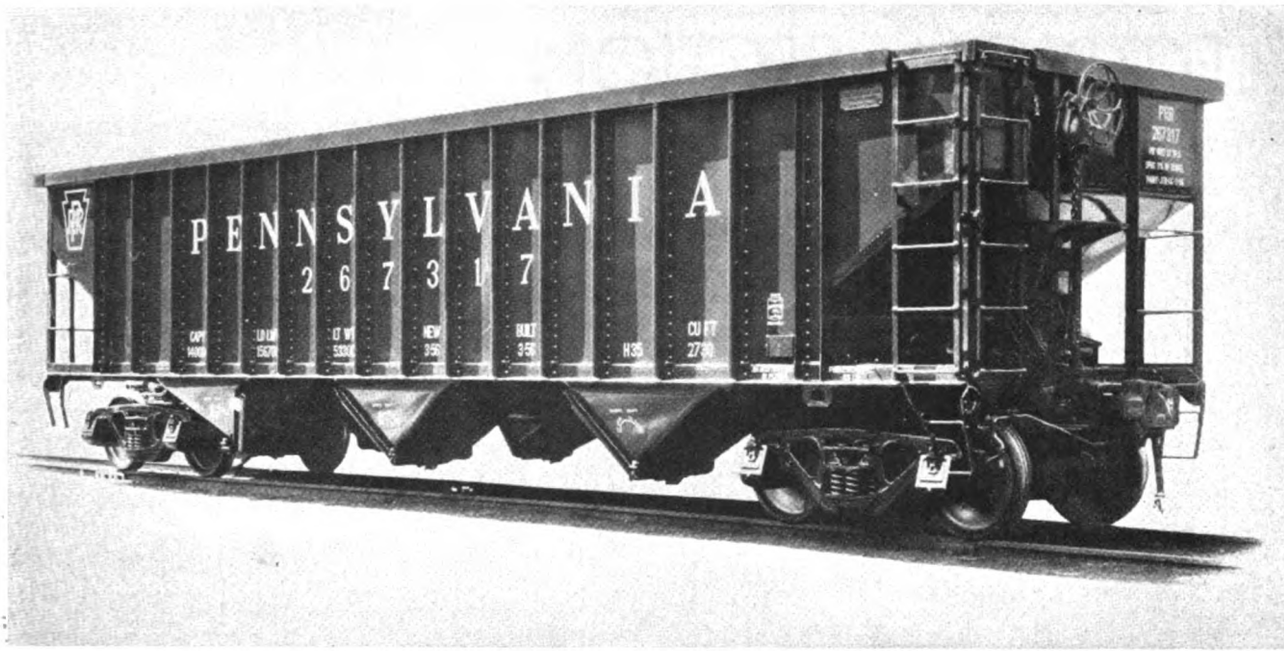
1. Quick Action Chamber has been charged to equal pressure of Brake Pipe.
2. Return Spring moves emergency piston and slide valve from Accelerated Release to Release position.
3. Accelerated Release Check Valve is seated.
4. Emergency slide valve blanks brake cylinder passage c-3.
5. Brake Pipe will continue to charge from Brake Valve or Supply Line.



Sketch 19

Service Portion Release After Accelerated Release

1. Brake Pipe pressure, having become greater than that of Auxiliary Reservoir, moves Service Piston and Slide Valve to Release Position.
2. Charging port is opened from Brake Pipe to Auxiliary Reservoir.
3. Slide Valve (SV) connects brake cylinder passage to Retaining Valve and Exhaust.
4. Auxiliary Reservoir air passes through slide valve to Emergency Reservoir.
5. Brake Pipe pressure enters space between Limiting Valve Check Valves.



"Pennsy" standardizes on high strength low alloy steels containing nickel for ALL new hopper cars

Pennsylvania Railroad recently received delivery of a fleet of new 70-ton hopper cars.

The high tensile steel plates which contact the lading are expected to last approximately 50% longer than the carbon steel sheets formerly used in hopper cars of this type.

To provide this increased life expectancy, the "Pennsy" is standardizing for all new open-top hopper cars, on the use of high strength low alloy steels containing nickel, for all body sheets which contact the lading.

This policy provides extra strength, wear- and corrosion-resistance without adding to weight. As far as maintenance costs are concerned, the use of high strength low alloy steels permits the "Pennsy" to cut heavy repair work and "out-of-service" time in half.

High strength low alloy steels are ideal for railroad freight car bodies

They provide:

(1) Yield strength of 50,000 psi minimum in the as-rolled condition, which permits either:

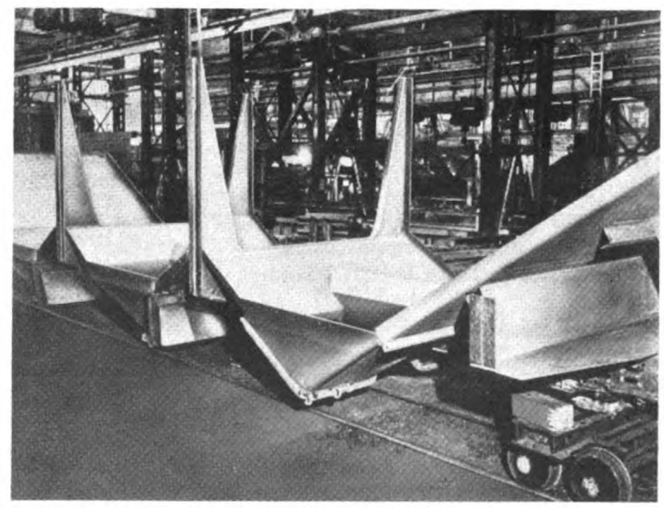
(a) appreciable weight reduction by using thinner sections . . . or

(b) if the same sections are used as for carbon steel, much better durability and minimum maintenance.

(2) Excellent response to usual fabrication operations . . . easy forming . . . easy welding.

(3) Good resistance to corrosion, abrasion and impact.

Send for "Nickel-Copper High Strength Low Alloy Steels." A copy is yours for the asking.



Stripped down hopper car shows the high strength low alloy nickel-containing steel sheets used in fabricating the PRR's new triple-hopper type cars. The use of high strength low alloy steels is expected to lengthen car life, reduce maintenance costs and provide greater equipment availability.

INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street New York 5, N.Y.

PRINTED IN U.S.A.

ELECTRICAL SECTION

The completed locomotive from the No. 2 end, showing multiple-unit connections for high-voltage trolley cable and control train lines.

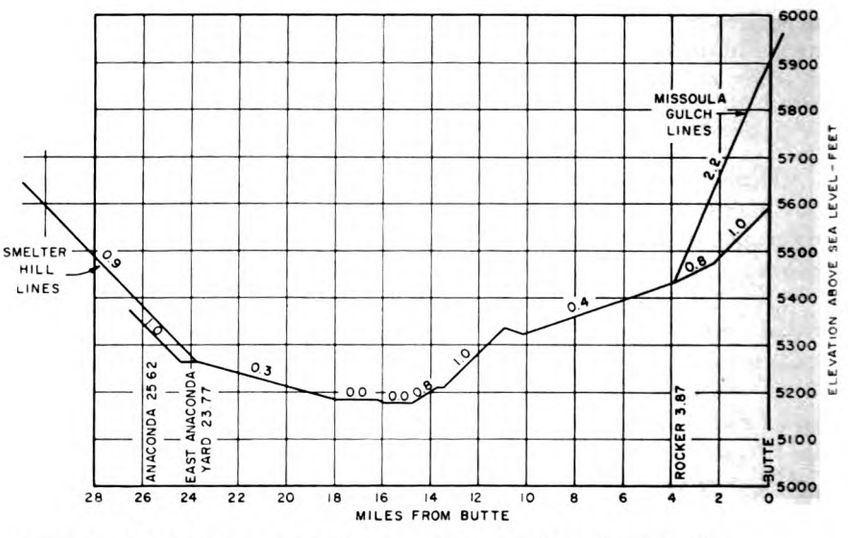
Old Electrification Adds New Electrics

Main line capacity of copper railway is increased by the addition of two new electric locomotives

THE BUTTE, ANACONDA & PACIFIC was electrified in 1913 with 1,500 volts d-c. The original fleet of 28 electric locomotives were recently supplemented by seven diesel switchers and main line capacity has now been increased by the addition of two new electric locomotives supplied by the General Electric Company.

Copper ore from the mines at Butte, Mont., to the smelter at Anaconda, Mont., comprises the major part of the traffic over the 26 route and 56 track miles of the railroad.

Two of the older 80-ton electric locomotives can handle 4,000 tons of ore over the profile. Ultimately the railroad plans to haul eight trains per day, each carrying 7,500 tons of ore. This weight of train can be hauled by the two new units which, in multiple, develop a starting tractive force of 150,000 lb and a continuous tractive force of 90,800 lb



Service requirements of the new motive power units are indicated by the profile.

at 20.5 mph. The units have a B-B arrangement and each weighs 250,000 lb.

The locomotive platform is of welded plate construction with overlapping, rather than butt welds, to reduce fitting time and promote an accurately shaped weldment. Since the platform is relatively long, a fish-belly design is used to give the required stiffness. The longitudinal space between the main sills is used as an air duct to supply traction motor ventilation.

Car body filters are installed in the blower compartment walls to insure clean ventilating air for the equipment.

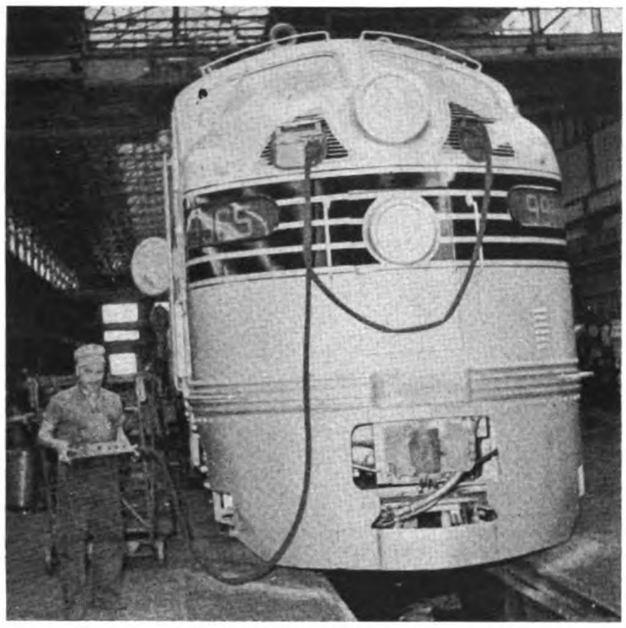
The welded two-axle truck has roller bearing journals. One brake cylinder per wheel actuates clasp-type brakes. The GE-729, 4-pole, d-c motor is rated 600 hp at 1,200 volts. Gear ratio is 82:15.

An m-g set driven by a 2,400-volt d-c motor furnishes excitation during regenerative braking. A belt-driven auxiliary generator provides 75-volt power for control operation, lights and battery charging. A ventilating blower for rotating equipment is driven from an extension on the motor armature shaft.

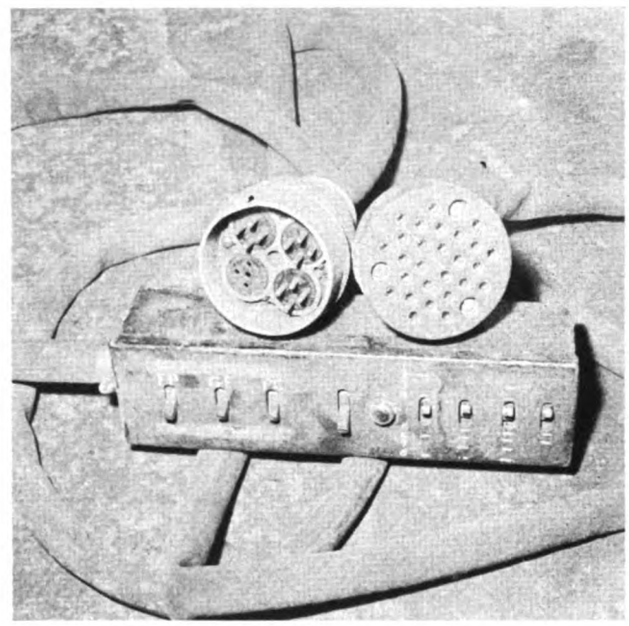
Air brake equipment is Westinghouse Air Brake Company 6SLM independent and automatic. Compressed air is supplied by two Westinghouse 2CMD air compressors. Regenerative braking is available from top speed down to approximately 11 mph.

Electrical protection for the whole locomotive is furnished by a JR high-speed circuit breaker. Auxiliary circuits are protected by fuses.

Possible life of electric locomotives is indicated by the fact that the new units are entering service side by side with the original locomotives built 45 years ago. Improvements in electrical equipment made since that time are indicated by the fact that the new units have a 46 per cent improvement in power-weight ratio.



A diesel-electric locomotive is walked forward and back in the No. 2 position, while a second man in the cab controls brakes.



A 27-point control plug and a control box with 8 switches are used to test locomotive functions. The brake plug serves only to bring 64 volts to the control box.

Walking the Locomotive . . .

AFTER ALL DIESEL locomotive control circuits are checked for continuity on the Chicago, Burlington & Quincy at West Burlington, Iowa, a second test is made to insure proper m-u operation.

The continuity test employs a standard control plug and cable on the end of which is a box containing 27 miniature 110-volt lamps. As each circuit is energized, the corresponding lamp lights, showing that the circuit is live and that the polarity is right.

To insure correct m-u operation, the two plugs and the control box illustrated are used. One of the plugs is a standard 27-point control plug and the other is a brake plug which is used only to bring battery voltage to the control box.

The four switches at the left of the control box are, respectively, fuel pump, generator field, *PC* control and reverser. The four switches at the right control the eight engine speeds. A test light in the center shows control power is on.

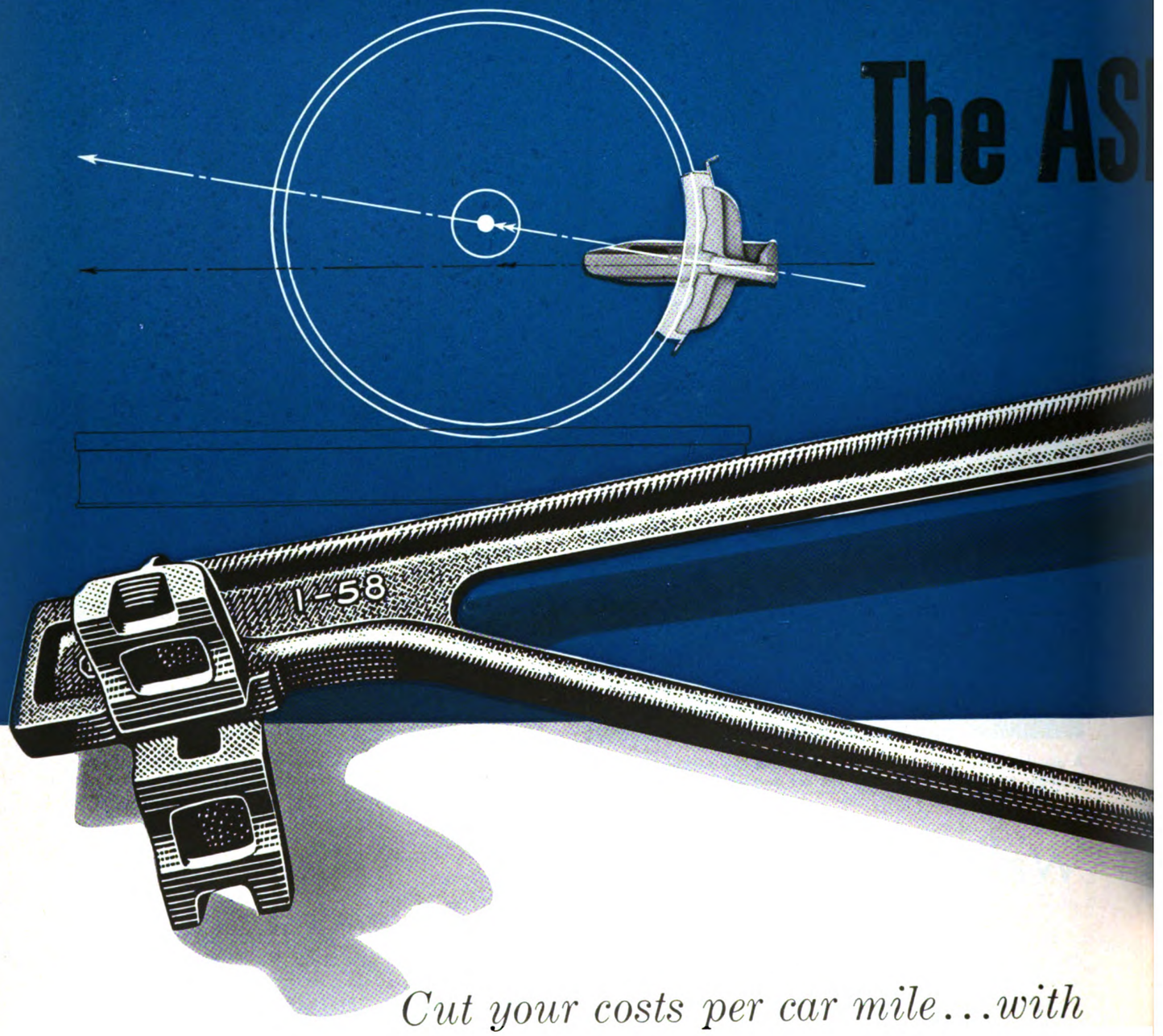
The various control functions are tried for passenger power, the locomotive is moved in the No. 2 position while a man in the cab controls the brakes.

E-8 and E-9 locomotive engines are run with the generator field connected in circuit and the contactors open.

E-5, E-6 and E-7's are tested without running the engine. Two men inside the locomotive check the operation of valves, contactors and field control.

NOW A.A.R.

The AS



Cut your costs per car mile...with

ASF CAST STEEL UNIT BEAMS

STANDARD...

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The new 24,000-lb. Cast Steel Unit Beam has higher capacity for higher brake pressures. And, like other ASF Beams of one-unit cast steel construction, it has greater strength, safety and rigidity . . . costs far less to maintain.

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AMERICAN STEEL FOUNDRIES

Prudential Plaza, Chicago 1, Illinois

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7 Roll Them Out Like New

Receiving and Inspecting Equipment at the Backshop

A preliminary inspection with simple tests can be used to determine if a job should be done in the railroad shop or sent out to a service shop

Up to this point we have been thinking about subjects applying to backshop work in general and the "hospitalization" of electric rotating equipment. Now we will examine closely the things that are actually done in a shop, and the reasons for the procedures discussed.

Railroad backshops vary greatly in size, and in their facilities and equipment. Some are able to handle all classes of repairs. Many, however, draw the line at heavy repairs. In many such cases advantage is taken of locomotive manufacturers' service shops or "unit-exchange" plans to handle heavy repair jobs. Therefore a decision must be made when a machine comes to the shop: shall the job be done here or shall it be sent out? A preliminary inspection with simple tests will furnish the basic information needed to help make this decision.

This is the seventh article in the series covering heavy maintenance of locomotive electrical equipment.

Part 7 is written by W. F. Davis, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

CHECK SHEET

Type_____ Form_____

Ser. No._____
Arm. No._____
Lot No._____
P.O. _____
Tester _____
Date

Insulation Resistance (megohms)

Total motor_____

Arm. & C.P._____

Fields _____

If O.K. give reduced hipot_____ volts a-c for 1 min_____

Remove covers and inspect brushholder for foreign material between holders and commutator. Comments_____

Armature will turn by hand Yes_____ No_____

Run light at normal speed_____ rpm

Comments on CE bearing_____

Comments on PE bearing_____

Comments on Commutator_____

Maximum vibration up to maximum speed of_____ rpm_____ mils

Commutator eccentricity in(____) middle (____) out (____)

Pinion nut & washer on _____ off_____

Covers on_____ off_____

Remarks_____

AUTOMOTIVE ELECTRICAL REPORT NO. 1

Stripping Report on_____ Type_____
Shop Order No._____ Cls. Reprs._____ Mfgr._____
Frame: Serial No._____ Mfgr._____ Job No._____
Armature: Serial No._____ Mfgr._____ Job No._____
Field: Serial No._____ Mfgr._____ Job No._____
Date received at shop_____ Date Stripped_____
Returned by_____ Removed Loco. No._____ Miles or years_____
Received in Car No._____ Stores_____ Roundhouse_____ Shop_____
Pinion_____ Pin Guard_____ Axle Guard_____ Air Intake Cover_____
Axle Cap- P.E. No._____ C.E. No._____
Axle Cap Alignment P.E._____ C.E._____
Serial No. of Pinion_____ Job No. of Pinion_____
Remove Pinion_____ Pulley_____ Condition_____ Fit on Shaft_____
Condition of outside_____
Condition of inside_____
Remarks:_____

Vibration as received_____ P.E._____ C.E._____
Resistance to ground complete equipment_____ Megohms_____
Iffoff reading is less than 100 megohms measure each past separately
Arm_____ Main Field_____ Com. Field_____ Brush Holder_____
Hipot: Frame volts__1__ Min. Armature volts_____ 1 Min_____
Hipot: Frame failed at volts_____ Minutes_____
Hipot: Armature failed at volts_____ Minute_____
Field coil: To be removed_____ Not to be removed_____
This equipment removed from service Mileage_____ Failure_____
If removed for failure show what found that caused failure:

Above inspection made by_____
Remarks:_____

Frame head or bearing housing.
Fit in magnet frame P.E._____ C.E._____
Repairs required: P.E._____
C.E._____
Inspected by_____
Brush holder inspection cover_____ Bushing_____
Cover Fastener_____ Cover Bolts_____
Thread in frame for fastening cover_____
Lower Support_____ Upper Support_____
Repairs required on frame housing_____
Remarks:_____

Above inspection made by_____

Fig. 1—Check lists vary from brief to elaborate forms.

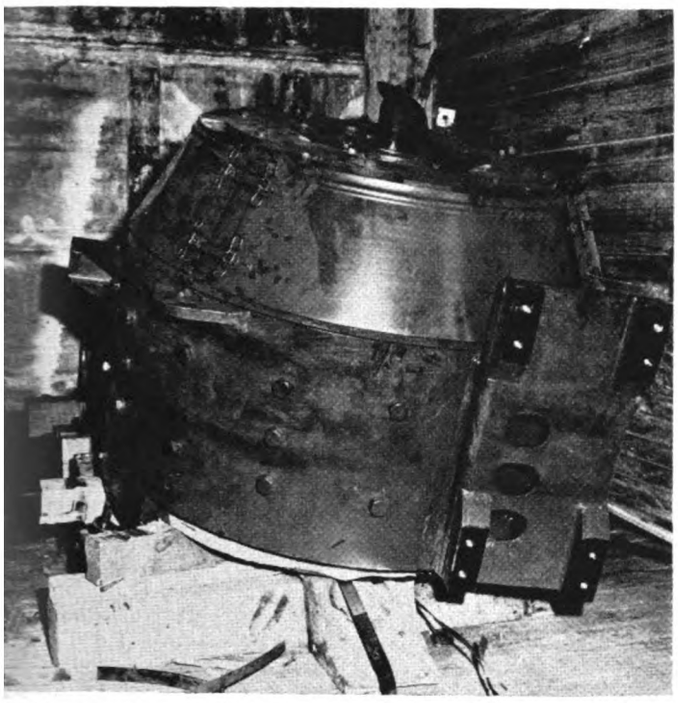

Fig. 2—Improper preparation for shipment can result in serious damage to equipment.

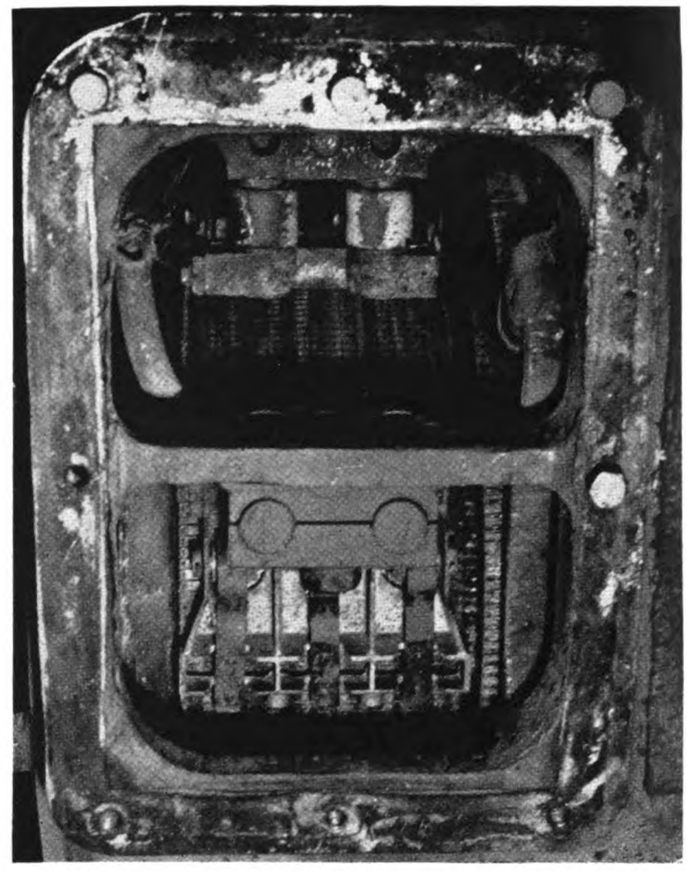

Fig. 3 (at right)—Flashed traction motor, showing dirty and roughened commutator surface, also dirty string band and brushholder insulators.

You're the Doctor

A doctor is experienced in reading the symptoms, diagnosing the case and prescribing for the patient. By close observation and a few simple tests you can determine the class of repairs required for the machines received at your shop. Using a check-off system, you can in a few minutes make a preliminary examination and enter important information on the patient's record. This will enable you to decide whether you have a routine case or one that requires surgery and a longer stay in the hospital.

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Mechanical Checks

The first series of checks you will make are of a mechanical nature. They are mainly concerned with things you can see and feel. Through them you get an idea of the physical condition of the machine externally. It is a good idea to have a flashlight, a light inspector's hammer, a pocket scale and a set of feeler gages. Now you are ready to start your inspection.

For example, check the axle caps on a traction motor. Are they tight on the rabbett fits? Can you enter a feeler gage? Are they so badly worn that you can enter your pocket scale? Note the serial numbers stamped on them and compare with the serial number of the motor frame. You may find that the caps belong to another frame and have been incorrectly assembled on your frame. If this is the case, you will probably find that they do not properly fit the frame they are now on. This means they will not clamp the linings with the proper degree of tightness. Perhaps the linings were so tight that the bearings ran hot! If you suspect this, check for further evidence of heating by appearance and smell. Also, inspect the wick lubricators to see if they have been damaged. Make a positive note that micrometer measurements be made of the axle bores before removal of the axle caps. Information of this sort should be relayed back to the people responsible for changing out the motors and axles.

Look for clues to possible mishandling of the equipment and comment on them in the check sheet. Flat spots spaced at 90-degree intervals around the commutator indicate that power was held on the motor with the locomotive at standstill. An unusual amount of dirt inside a machine may point to poor filter maintenance. Thrown solder is a sign of overheating, possibly caused by defective blowers. Worn pinion teeth may be the result of inadequate gear lubrication. A note about this may prove valuable if inspection of the pinion end bearing after disassembly shows the grease to be melted out, and the bearing worn and near failure. Although these two facts might seem unrelated, they are actually cause and effect. Heat developed by the unlubricated gearing has carried through the shaft to the bearing, overheating it.

You may also find damage as a direct result of improper

(*Continued on page 54*)

7 Roll Them Out Like New

Receiving and Inspecting Equipment at the Backshop

A preliminary inspection with simple tests can be used to determine if a job should be done in the railroad shop or sent out to a service shop

Up to this point we have been thinking about subjects applying to backshop work in general and the "hospitalization" of electric rotating equipment. Now we will examine closely the things that are actually done in a shop, and the reasons for the procedures discussed.

Railroad backshops vary greatly in size, and in their facilities and equipment. Some are able to handle all classes of repairs. Many, however, draw the line at heavy repairs. In many such cases advantage is taken of locomotive manufacturers' service shops or "unit-exchange" plans to handle heavy repair jobs. Therefore a decision must be made when a machine comes to the shop: shall the job be done here or shall it be sent out? A preliminary inspection with simple tests will furnish the basic information needed to help make this decision.

This is the seventh article in the series covering heavy maintenance of locomotive electrical equipment.

Part 7 is written by W. F. Davis, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

CHECK SHEET

Type_____ Form_____

Ser.No._____
Arm.No._____
Lot No._____
P.O. _____
Tester _____
Date

Insulation Resistance (megohms)

Total motor_____

Arm. & C.P._____

Fields _____

If O.K. give reduced hipot_____ volts a-c for 1 min_____

Remove covers and inspect brushholder for foreign material between holders and commutator. Comments_____

Armature will turn by hand Yes_____ No_____

Run light at normal speed_____ rpm

Comments on CE bearing_____

Comments on PE bearing_____

Comments on Commutator_____

Maximum vibration up to maximum speed of_____ rpm_____ mils

Commutator eccentricity in(____) middle (____) out (____)

Pinion nut & washer on _____ off_____

Covers on_____ off_____

Remarks_____

AUTOMOTIVE ELECTRICAL REPORT NO. 1

Stripping Report on_____ Type_____
Shop Order No._____ Cls. Reprs._____ Mfgr._____
Frame: Serial No._____ Mfgr._____ Job No._____
Armature: Serial No._____ Mfgr._____ Job No._____
Field: Serial No._____ Mfgr._____ Job No._____
Date received at shop_____ Date Stripped_____
Returned by_____ Removed Loco. No._____ Miles or years_____
Received in Car No._____ Stores_____ Roundhouse_____ Shop_____
Pinion_____ Pin Guard_____ Axle Guard_____ Air Intake Cover_____
Axle Cap- P.E. No._____ C.E. No._____
Axle Cap Alignment P.E._____ C.E._____
Serial No. of Pinion_____ Job No. of Pinion_____
Remove Pinion_____ Pulley_____ Condition_____ Fit on Shaft_____
Condition of outside_____
Condition of inside_____
Remarks:_____

Vibration as received_____ P.E._____ C.E._____
Resistance to ground complete equipment_____ Megohms_____
Iffoff reading is less than 100 megohms measure each past separately
Arm_____ Main Field_____ Com.Field_____ Brush Holder_____
Hipot: Frame volts__1__Min. Armature volts_____ 1 Min_____
Hipot: Frame failed at volts_____ Minutes_____
Hipot: Armature failed at volts_____ Minute_____
Field coil: To be removed_____ Not to be removed_____
This equipment removed from service Mileage_____ Failure_____
If removed for failure show what found that caused failure:

Above inspection made by_____
Remarks:_____

Frame head or bearing housing.
Fit in magnet frame P.E._____ C.E._____
Repairs required: P.E._____
C.E._____
Inspected by_____
Brush holder inspection cover_____ Bushing_____
Cover Fastener_____ Cover Bolts_____
Thread in frame for fastening cover_____
Lower Support_____ Upper Support_____
Repairs required on frame housing_____
Remarks:_____

Above inspection made by_____

Fig. 1—Check lists vary from brief to elaborate forms.

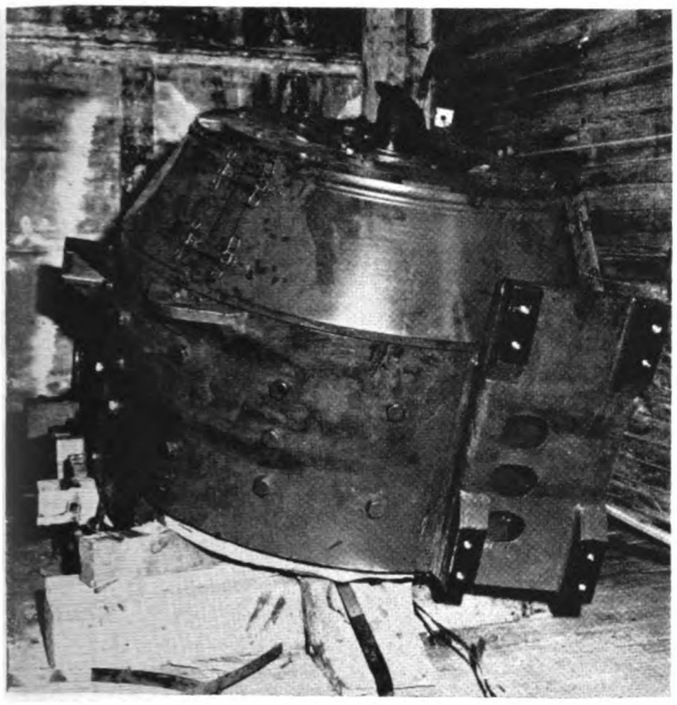

Fig. 2—Improper preparation for shipment can result in serious damage to equipment.

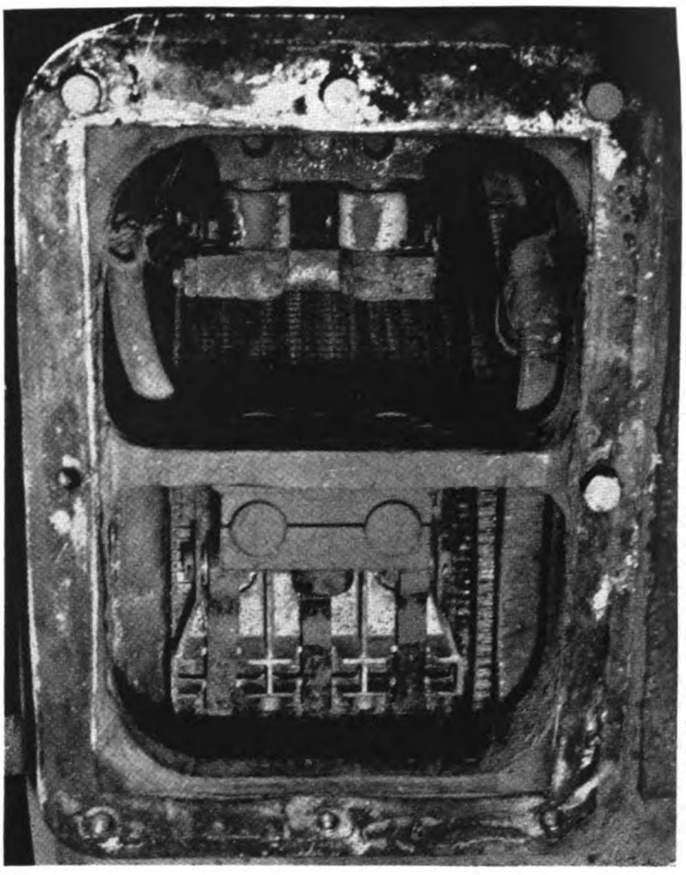

Fig. 3 (at right)—Flashed traction motor, showing dirty and roughened commutator surface, also dirty string band and brushholder insulators.

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You may also find damage as a direct result of improper

(*Continued on page 54*)

Fir Plywood modernize

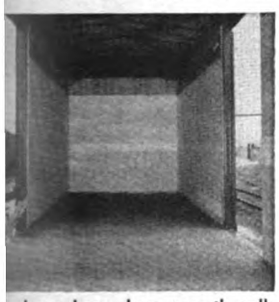
Only Exterior Fir Plywood car lining has all these advantages:

LOW COST—Easy to install fir p
wood lining speeds work . . . saves
per cent and more in labor costs ab

ıelps S. P.
ɔoxcars fast!

r time averages 8 to 10 hours
ar, including preliminary fram-
relining, cement coating floor.

operated stapling guns fasten
ood securely over old lining.
is new, works well, S.P. reports.



ed cars have clean, smooth walls
can't snag fragile ladings such
agged sugar or flour.

New method of stapling fir plywood over damaged lumber lining permits Southern Pacific to upgrade B and C cars to Class A carriers in only one-third the time and half the cost.

SOUTHERN PACIFIC has opened the throttle on one of the biggest car modernizing programs in its history. Work on over 400 cars is proceeding at a good clip and at remarkably low cost at the line's big West Oakland and Roseville (California) yards.

Credit for the outstanding speed and economy with which the job is being done is credited to a new technique; stapling big sheets of Exterior plywood over the old lumber lining.

The method takes only about one-third the time normally required for re-lining a car with T&G lumber—and cuts total costs just about in half. A big factor in the savings is that the old lining does not have to be torn out, as would have been the case in a lumber re-lining job.

The job is done by a two-man crew who tack panels in place horizontally so that two 4-foot wide sheets make up the required eight foot height. Since most cars are a bit over 17 feet from door frame to end, one 8-foot and one 10-foot long panel cover each course. Vertical joints are staggered. Then two more men follow up for finish stapling, shooting fastenings every six inches around panel edges and over vertical posts spaced 20 inches apart.

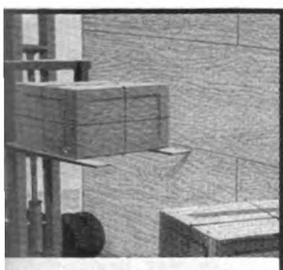
One of the chief advantages of the plywood-stapling method is that cars are out of service for a very short time. Beyond that, it's the best and most economical way of doing the job. But the payoff is in the more valuable ladings which can be carried in a Class A car, and it is often enough to pay off the entire upgrading cost in a single long run.

FOR MORE INFORMATION *write (USA only) for free "Plywood Industrial Uses Portfolio." Douglas Fir Plywood Association, Dept. 194, Tacoma 2, Washington.*

DFPA TESTED QUALITY

Only panels bearing DFPA grade-trademarks are manufactured under the industry-wide Douglas Fir Plywood Association quality control program. Always look for the letters DFPA.

Fir Plywood



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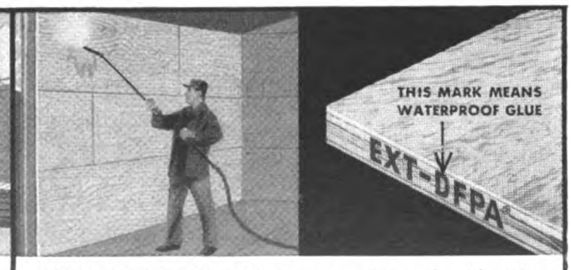
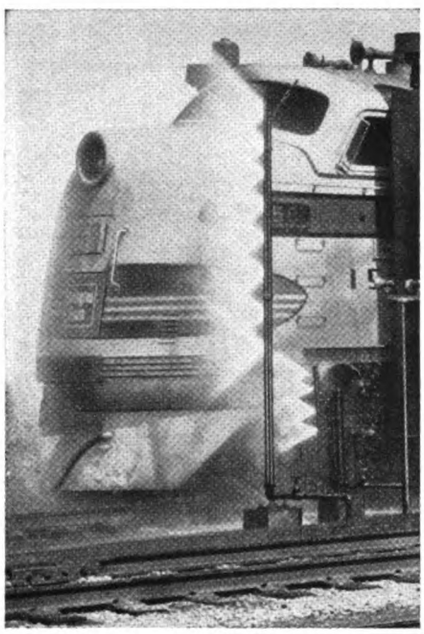
esistance . . . shrugs off blows
ld split ordinary lumber.

SMOOTH — Clean, snag-free fir plywood lining pays off by yielding higher tariffs on fragile ladings.



WATERPROOF — Exterior plywood is made with waterproof marine glue, in several sizes and grades, including overlaid panels with hard, smooth, fused-resin fiber overlays.

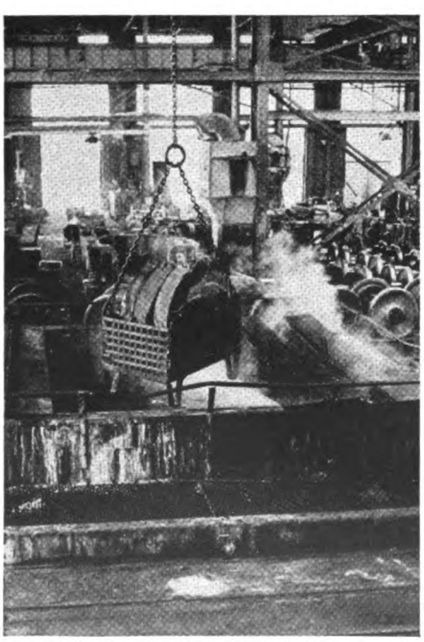
HERE ARE WYANDOTTE CLEANIN



About 15¢ per unit for exterior diesel cleaning (machine washing). With an automatic washer and using WYANDOTTE-75, your diesels will be sparkling clean in just 1½ minutes per unit.

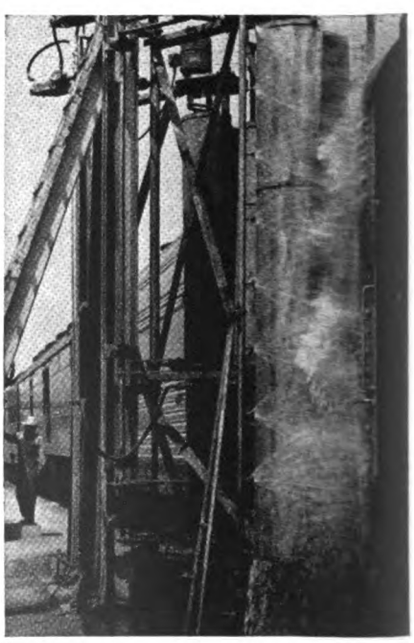
Only $1.35 per passenger diesel unit interior, using WYANDOTTE-30. No back-breaking labor. No costly hand wiping with Wyandotte spray-on, spray-off method. Units are sparkling clean, oil-free.

For less than $7, and in less than 8 minutes, WYANDOTTE-21 strips all paint from a boxcar. This cost includes stripper, labor, phosphatizing, and *all* other costs. Stripping tunnel is used; no hand labor.



Just 2½¢ to vat-clean a ton of ferrous parts with WYANDOTTE-11. This cleaner has good emulsifying characteristics, long service life, 100% solubility in water, controlled uniform quality, and low use-cost.

Only 3¢ to vat-clean a ton of aluminum parts with WYANDOTTE ALTREX.® You'll get a better cleaning job, and a faster one, with ALTREX. Compare this cost with that of any other cleaner on the market.



Just 13½¢ and one minute clean exterior of a passenger car (machine washing). Using WYANDOTTE-85, your cars stay bright and clean without paint damage. WYANDOTTE-85 is well inhibited, too!

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Use Wyandotte's cleaning service. It gets results—saves time, saves dollars!

Your Wyandotte cleaning specialist is assigned permanently to your line. He devotes his time to improving your cleaning in any local area or on a systemwide basis. Thus, he coordinates his activities with the requirements of your mechanical, purchasing, and test departments.

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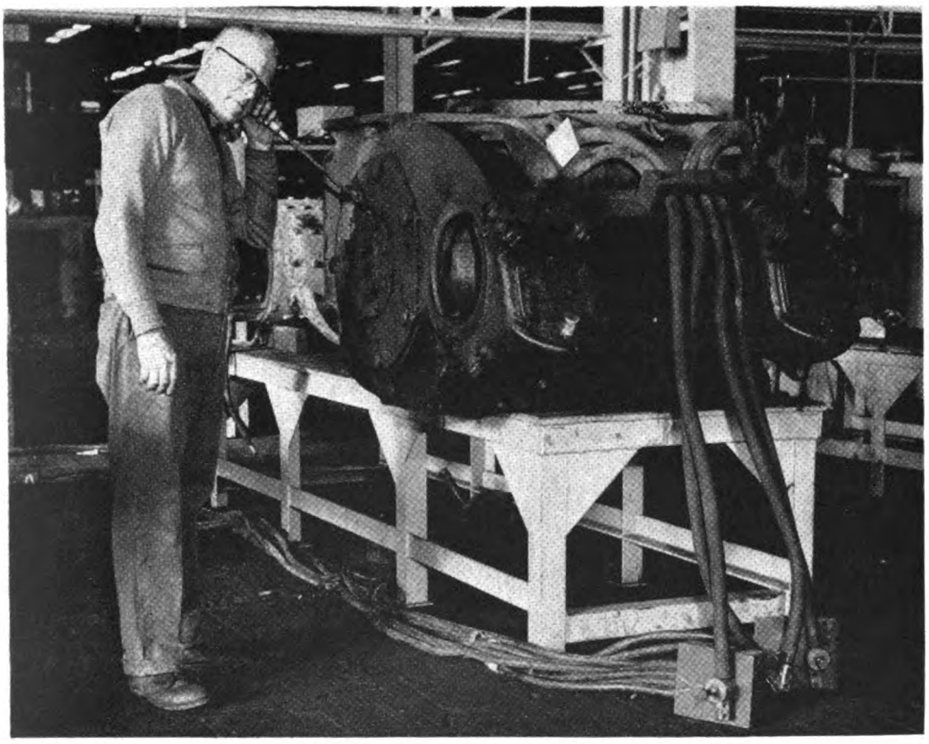

Fig. 4—Traction motor bearings can be given a quick check by listening to them while the motor is running light.

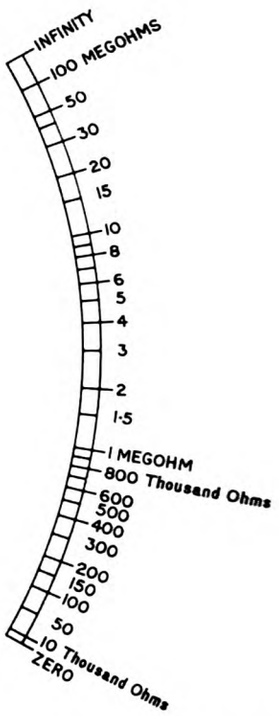

Fig. 5—Scale used on one form of insulation resistance tester.

skidding or shifting of the load in transit to the shop. An example of this is the generator shown in Fig. 3. Look at the mess! The light cargo strapping used to fasten it to the skids has burst, allowing the machine to tumble over on its end.

So far you have obtained important information for your records by means of a simple external inspection. The next step is to look inside the machine. Carefully remove the protective covers, and inspect the commutator and brush holders. Note anything unusual, such as overheating, throwing of solder, melting of brush holders or other evidence of flashover damage. This will include burning or smoking of the commutator string band and other important insulation creepage surfaces (Fig. 3). Look for lifted leads or "rat holes" behind the commutator risers. To do this you will need help to turn the armature over slowly so you can check thoroughly all around the commutator.

Your inspector's hammer will enable you to check tightness of polepiece bolts, framehead and bearing cap bolts, and wear plates. Or, you may use it inside if you suspect looseness of parts, such as brush-holder bolts. You may decide to postpone the inspection of outside bolts until the machine has been cleaned. This is wise if there is a heavy buildup of "cruddy" dirt, such as you often find at the pinion end of a traction motor when gear compound has been leaking badly.

Electrical Checks

Looking and smelling will tell you something about the condition of the electric windings and insulated parts of the machine. However, you will have to test the electric insulation to answer the all-important question—is it good or bad? The tool for this insulation test is the portable megohmmeter. It indicates insulation resistance values directly on a numerical scale. One commonly used type has a scale as illustrated in Fig. 5. As you can see, the scale divisions are not equal. For instance, a resistance of one megohm occupies nearly a third of the scale at the zero end. Near the infinity end of the scale the same value of resistance occupies only a few hundredths of an inch. Remember this when you are using such a meter. Standard testers are available in a wide range of voltages. The 500 and 1000-volt sizes are the most common on railroad properties.

The insulation tester is no "magic box." Values it indicates will vary, depending on length of time for the test, instrument voltage, temperature of the winding, humidity, etc. Your job is to analyze the readings in the proper light. In general, the backshop is interested only in measurements taken at room temperature, and you will seldom need to interpret hot machine readings. Curves are available in manufacturers' instruction books so that, if necessary, you can correct readings for temperature. By doing this all readings can be put on a comparative basis. They then will serve as an indication of the insulation condition—whether it is clean or dirty; wet or dry; good or bad.

Know What Good Insulation Should Look Like

When making measurements it is also most important to note the appearance of the insulation. Write down your opinion of the appearance of the important creepage surfaces along with the insulation resistance readings. Also, note whether the machine is wet or dry. Watch out for moisture in machines that have been exposed to rain or snow during shipment; or stored in a damp place for some time; or brought out of the cold into a warm shop. Moist creepage surfaces will act like dirty ones and lower the insulation resistance reading. Partly dirty surfaces are specially susceptible to this. You will want to wait for the insulation to dry off before measuring its resistance. The drying can be hastened by blowing warm air on the machine or by baking it in an oven.

By a short series of readings with your tester you can localize electric insulation trouble if it exists. Suppose, for instance, that a motor comes in tagged "grounded." Naturally, you will want to confirm this. If it is true the defective part will have to be repaired. But experience has probably taught you that many such reports have turned out to be false

(*continued on page 56*)

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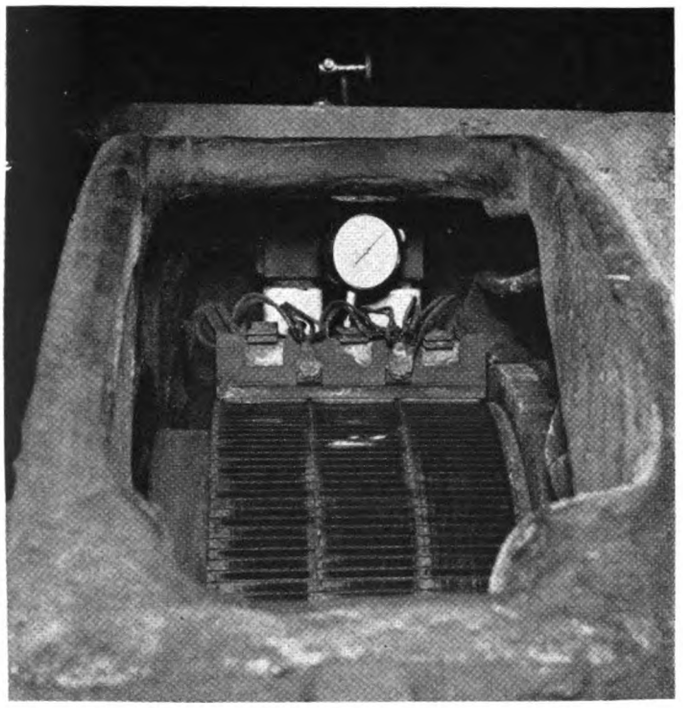


Fig. 6—Commutator surface can be checked accurately by means of a dial indicator mounted as shown.

alarms. Perhaps all that is needed is to clean the string band! Your insulation tester will help locate the "ground" in one of the field winding circuits, the armature, or the brush holders.

You can use the strategy of "divide and conquer" in checking out this motor. By connecting the tester to the main field leads coming out of the frame you can measure the insulation resistance of the existing field winding. Connecting to the armature leads gives you the insulation resistance of the armature and commutating field in series. Suppose the ground shows up in the *A—AA* circuit. If you have access to the brushes you can lift them off the commutator, thus breaking the circuit into two parts. Now you can measure the armature and commutating field separately. It is impractical to try to pinpoint the individual faulty field coil until the machine has been disassembled.

When reading your tester, be specially careful to note the exact needle deflection if it is near zero. Don't record "zero ground" or "zero megger" if the needle reads upscale as little as a sixteenth of an inch! As long as there is life in the insulation there is hope that it may be restored. Give the patient the benefit of the doubt. He may be almost gone, but there is still a chance that you can bring him around. If you suspect that moisture is causing the low readings, you may want to dry the machine more and try again. If the insulation is dirty, brushing the creepage surfaces may increase the readings considerably. On the other hand, you may decide to go ahead with routine teardown and wait until after cleaning and drying out before taking another insulation resistance reading.

Other Tests before Disassembly

The routine of some shops calls for a high potential test to follow the insulation resistance test before the machine is disassembled. Unless proper precautions are observed, high potential testing can be dangerous to both personnel and machines. Most shops have definite rules about such testing, and locate the equipment in a restricted area under the supervision of a qualified tester. They also require a certain minimum insulation resistance reading of a safe value before permitting the high potential test to be applied. Be sure never to put overpotential on a machine whose insulation resistance is below the safe limit. You can obtain values of this limit for various machines from the manufacturers' instruction books and recommendations of the AAR.

Like the routine test run, which is standard practice for running maintenance, incoming machines may occasionally be run light. By so doing you can confirm suspicions you may have regarding previous abuse in service. You can also get a more accurate measure of the "as received" condition of the machine. At this time you can check the commutator by feel, listen to the bearings, (Fig. 4), and check the general rotating balance. Applying voltage will also show whether the machine is operative electrically, or whether it sends out a shower of sparks from the brushes.

Don't Make Unnecessary Tests

In making your decision regarding the running test, you will have to balance the advantages against the added time and cost. The value of this check will depend somewhat on whether the machine is to be disassembled and have its parts completely checked before reassembly. When this is done, some of the checks made when running light will be duplicated when the parts are checked later.

An accurate way to measure the eccentricity of the commutator is to mount a dial indicator as shown in Fig. 6, and turn the armature by hand. The total indicator deflection is a measure of the commutator runout. Sudden swings of the needle will indicate surface irregularities, such as flat spots or high bars. If you find flat spots spaced 90 degrees apart on the commutator of a traction motor, you have evidence that the engineman was at fault.

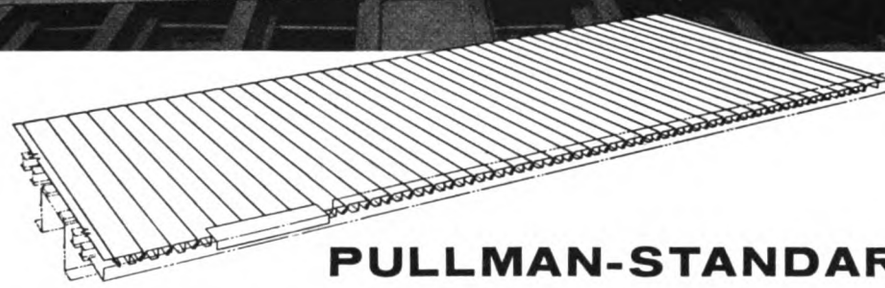
Any generator can be run light as a motor for testing, provided separate excitation is furnished for the field. This test is more difficult in the case of a single-bearing main generator since it requires using a special adapter with an outboard bearing. Standard practice on most railroads is to test main generators under load while mounted on the engine. Two-bearing auxiliary machines may easily be run light if desired.

What's the Use?

The few simple tests and observations before disassembly that have been described in this article are most valuable. As you have filled out the various items on the check list, you have accumulated the same kind of information as a doctor has in the case history of a patient. When the machine is torn down and inspected, these records can save you time and money. They will tell you where to look for trouble, and help you decide whether parts should be used, reworked or scrapped.

Not only does the backshop benefit by these records, they are also valuable for running maintenance and operating crews. Conditions caused by abuse or neglect will come to light when the machine is torn down in the backshop. This fact is a sort of check that helps keep the men out on the road on their toes. As a result of what he finds, the backshop man can often suggest improvements in running maintenance routines that will improve performance and reduce expense.

There are many opportunities for backshop and running maintenance people to be mutually helpful. As cooperation of this sort is developed between the two groups they will become a smooth running, efficient team. The results will show on the score board as reduced maintenance expense and improved locomotive performance.



PULLMAN-STANDARD

NAILABLE STEEL FLOOR

provides 33% more nailing space... plus exceptional nail holding power

Cost and service conscious railroads all over the Great American Railway System are replacing wood decking with long-lasting, easily installed Pullman-Standard Nailable Steel Floor. Prominent carriers have over 2500 car sets of this outstanding lading and equipment protection product now in service or on order with Pullman-Standard.

Behind these users' decisions to specify Pullman-Standard Nailable Steel Floors is the knowledge that they are built to provide exceptional durability and strength plus superior nailholding power. And floor maintenance is minimized . . . cars stay in service longer. Costly floor repairs and cooperage are practically eliminated.

The P-S Nailable Steel Floor design includes ample nailing space, contributing to lading security for your shippers. 99 car-width grooves in a 50′-6″ box car and 79 in a 40′-6″ box car means 33% more nailing space than other steel floors. Permits any conventional arrangement of car bracing, blocking or bulk-heading.

For complete details on this exceptional lading protection and car maintenance-reducing product by Pullman-Standard, write for literature or contact your nearest P-S sales office.

- P-S design provides exceptional nail holding power with any size nail from 16d to 40d.
- Steel angle supports and plank joints provide floor support every three inches . . . help prevent crushing and dishing by heavy lift trucks and racks.
- P-S narrower planks on 6″ centers provide greater strength and more nailing grooves.
- P-S flexible nailing joint snaps back . . . retains original holding power even after use of 30d or 40d nails.
- 1/16″ underframe clearance built into plank joints prevents offsetting . . . planks are always level.

WORLD'S LARGEST BUILDER OF ROLLING STOCK

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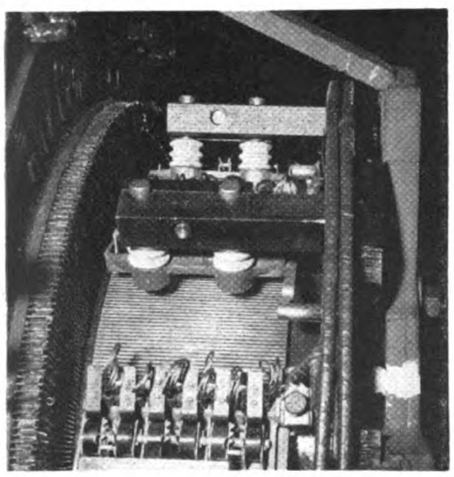
CAR MANUFACTURING COMPANY

221 N. LA SALLE STREET, CHICAGO 1, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

HOW MUCH DO YOU KNOW ABOUT BRUSHES?

How Should a Brush Test Be Handled?



THERE ARE TWO TYPES of brush tests. One may originate from dissatisfaction with the performance of the present grade in use, or on the premise that a different grade will give better performance. The second type of test represents the introduction of a new grade by some brush manufacturer. Normally, with the first type of test, the following items of information are the least that is necessary.

1. Choose commutators that are in Class A condition, using the standard accepted rating method.

2. Rubber stone previous brush grade's film off of commutator.

This is the eleventh of a series of questions and answers which are appearing each month.

3. Install test brushes, measuring length of 6 o'clock stud brushes on motors and in 10 o'clock stud on generators. Never assume standard length of brushes, especially on a competitive test. On generators true life reading will be high if the width of the toe of the beveled end is increased from the standard width. Make all measurements with a caliper in 1/64 in.

4. A responsible representative of the railroad should always be present to observe the collection of installation or inspection data.

5. Record unit number, generator or motor serial number, truck number if testing on motors, unit mileage, motor or generator mileage, and commutator classification.

6. Mark or tag all motors or generators involved in a test.

7. Never run a brush test without a control test of the standard brushes on alternate motors of a given unit, or on the opposite generator if on a passenger unit with two generators.

8. In a competitive test, no one representative should be permitted to inspect the tests without a responsible railroad representative present.

9. Agree on at least a tentative data for follow-up on the test at the time of installation.

10. Record the same data as above on subsequent inspections plus measuring brushes to calculate life per ⅛ in. and rating the commutator classification.

11. If possible, photographs should be made in color of the commutators when brushes are installed and on subsequent inspections.

12. Unauthorized tests can be costly in the form of damaged motors or generators.

13. Tests should include a minimum of eight test motors and eight control motors; for generators a minimum of three each should be used. A test on one or two motors is usually made worthless because of operating variables and the fact that motors vary from motor to motor in commutating characteristics. (This is why a blackband test is so important in establishing the range of commutation tolerance of a brush grade.)

The second type of test requires definite knowledge of the commutating ability of the brush grade to be tested. Railroads can save time and money by eliminating indiscriminate testing of brush grades which have not been screened by a blackband test for commutation on the particular electrical machine involved. Most reliable brush manufacturers have a cooperative arrangement with the locomotive builders to complete this preliminary step before submitting a brush grade to the railroad for testing.

When permission has been given to install a test the same information previously outlined must be collected.

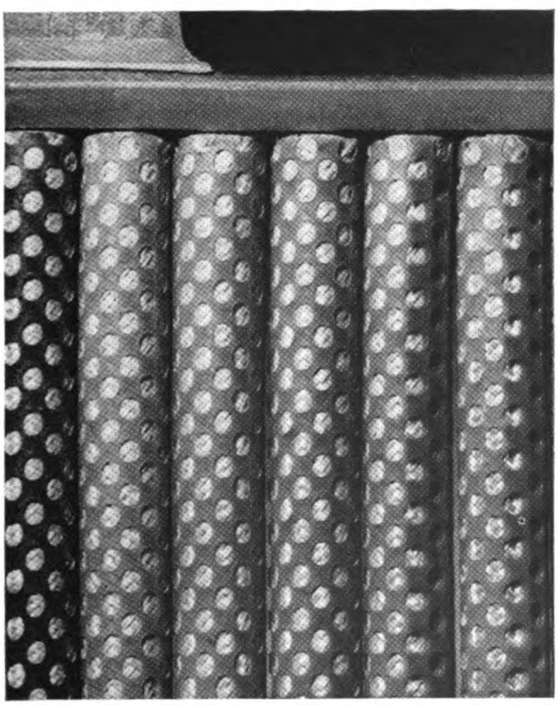
By K. R. MATZ
National Carbon Compa

Here's Progress in Clearing Carbon Grounds

L. M. LEGG, electrical engineer of the C&NW, developed a machine in 1952 for the primary purpose of clearing up grounds in windings of a diesel locomotive main generator so the locomotive could continue in service until the next general repairs. Used experimentally for over a year, it successfully cleared up grounds in five of seven main generators and one of three traction motors caused by carbon (See Railway Locomotives and Cars, March 1953, pages 96-97). The machine will not clear up moisture grounds, solid metallic grounds, or repair damaged insulation.

Known as the Elco process, the machine now has been simplified, and the North Western to date has cleared grounds and returned to service 27 locomotives out of 35 attempted. In each of these cases, the process was not used until after all other known methods for clearing grounds had failed, and the generator scheduled for removal, an expensive undertaking. Its use is simple. The affected piece of apparatus is isolated electrically from all other circuits. The portable Elco machine, weighing 37 lb, is attached and operated by a qualified electrician. A "hashed" current (without form or pattern) of very small value is caused to flow through the carbon crust which causes disintegration by transforming a portion of it to gas. If the ground is caused by carbon, it should begin to clear before the machine has been in use one hour. The North Western has found it not uncommon to clear a main generator from a zero resistance reading to infinity in five minutes.

MAKE YOUR MONEY GO FARTHER



Here's the secret. Positive plate features new armored porous tubing developed out of 15 years' research. Prevents shedding. Improves access of electrolyte. Stretches battery life. New MGD can crank longer and recuperate faster.

New MGD Exide-Ironclad Diesel Locomotive Battery gives you better battery performance, yet costs you less to own and operate

Some things cost you more today. But the new MGD Exide-Ironclad Diesel Locomotive Battery actually gives you more battery for your dollar—and costs you less to own.

In designing the MGD, Exide engineers found the way to unlock more power from battery materials. This new design makes the MGD a more efficient battery—hence a more economical one. What's more, its superior performance characteristics and longer life potential stretch your battery budget even further.

Only Exide could have given you this battery. Because only Exide has the tubular plate construction that makes these advances possible. Write for complete illustrated bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

Rain or Shine suit

WEATHER WAS IDEAL for the recent performance trials on a 74-mile taconite plant railroad in northern Minnesota—it rained and rained for four of the six days and everybody and everything got running wet—including the Cobra Shoes.

But it didn't matter as far as Cobra Shoe performance was concerned. Stop distances from day to day varied only 30 to 40 feet—wet or dry. There was no apparent difference—stops shorter and longer than the median were just about equally proportioned between wet and dry. Write for complete information about Cobra Shoes.

Cobra Shoe performance is <u>not</u> affected by moisture

Product of the combined research facilities of . . .

Westinghouse Air Brake Company
Specialists in Braking

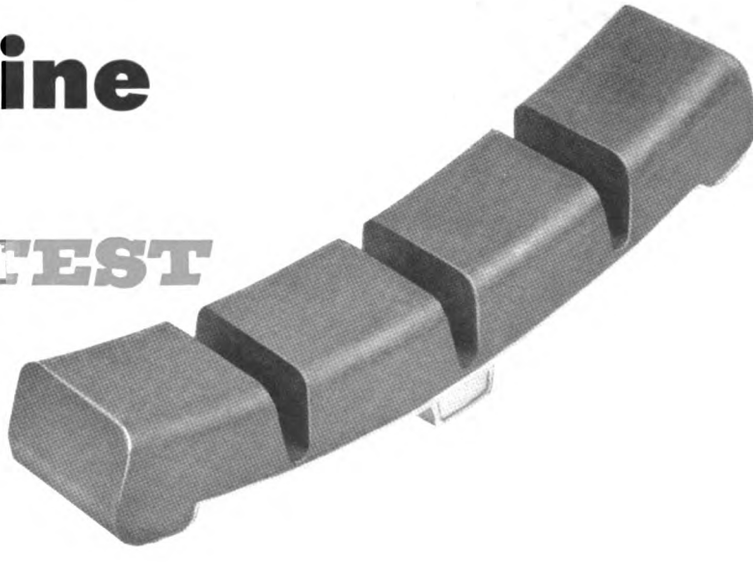
Johns-Manville
Specialists in Friction Materials

RAILROAD FRICTION PRODUCT

OBRA* SHOES fine

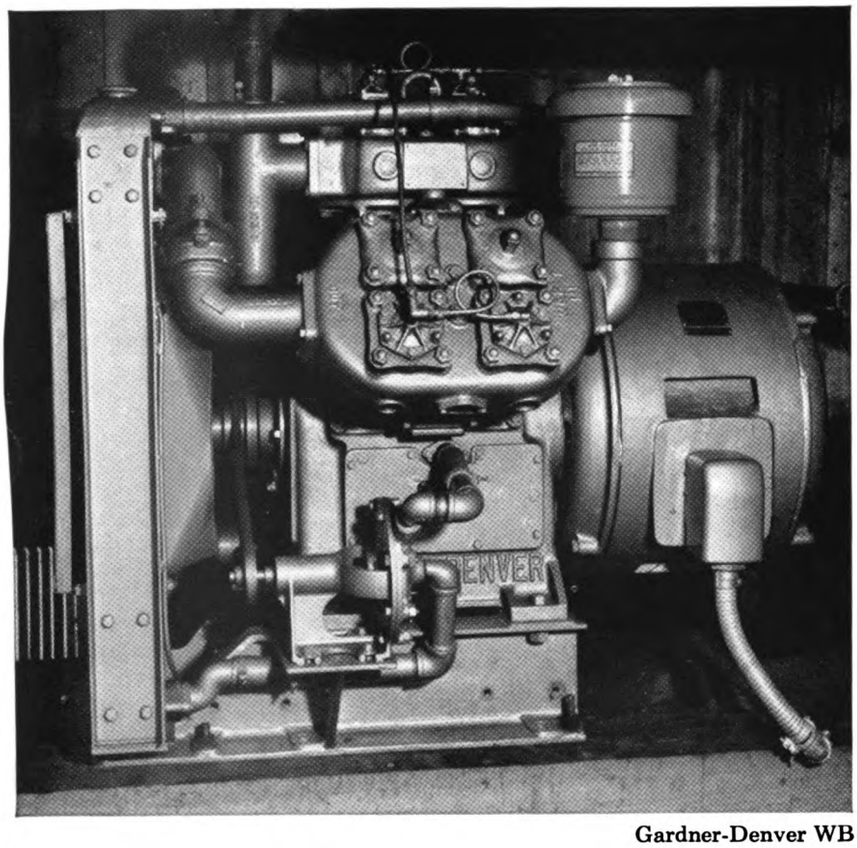
COBRA* SHOE TEST

TEST TRAIN CONSIST—5-unit locomotive, 3 cabooses, 97 cars. Gross 12,960 tons—Empty 3,865 tons.
TEST PROCEDURE—(1) Service stops (2) Emergency stops (3) Running release after slowdown (4) Operation down seven miles of 2% grade.
OBSERVERS—55 individuals from 30 railroads including vice presidents of operations, general managers, superintendents of transportation, air brake supervisors.



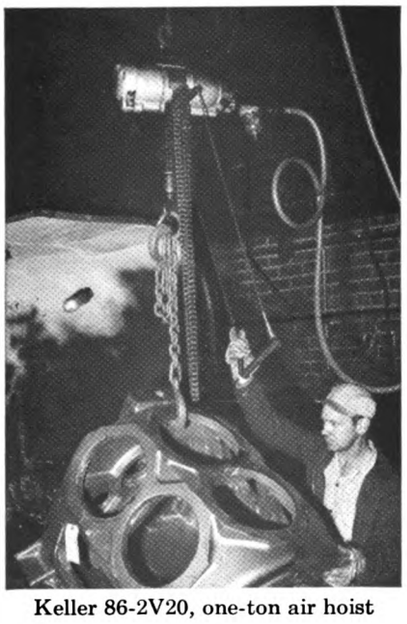
* *Registered U. S. Trademark, Composition Brake Shoe*

ORPORATION, *Wilmerding, Pennsylvania*



Gardner-Denver WB

Maintain with air... Gardner-Denver air and tools



Keller 86-2V20, one-ton air hoist

Here's real "go power" for the many air jobs around the car and engine shop: the Gardner-Denver WB compressor. This compact, water-cooled compressor package is designed to meet air demands without special handling . . . runs steady with minimum maintenance. Eight models to choose from: displacement from 142 to 1150 cfm.

For rugged, keep-on-the-go air tools, choose from the Keller line of air hoists, impact wrenches, drills and grinders . . . Gardner-Denver air motors, breakers, diggers, tampers. These quality tools stay on the job, need little servicing.

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd.,
14 Curity Avenue, Toronto 16, Ontario

What's New

(*Continued from page 18*)

Milling Machine Manufacturer's standard spindle nose are retained. This spindle nose accommodates a complete new line of No. 50 series standard flanged arbors and adapters. These arbors can also be used on older machines without the Arbor-Loc feature. Special purpose quickchange accessories are not required.

The four-piece Arbor-Loc can be dismantled within a minute's time when desired to mount face milling cutters on the spindle nose. *Cincinnati Milling Machine Company, Dept. RLC, Cincinnati 9.*

Acetylene Generator Has Automatic Signal System

The Oxweld MP-11 acetylene generator has a newly developed automatic signal system. With a carbide capacity of 500 lb, the MP-11 will produce 1,000 cu ft of medium-pressure acetylene per hour. Delivery rates of up to 2,000 cu ft of acetylene per hour are obtainable over short intermittent operating periods.

The automatic signal system consists of a howler and indicator lights that provide both audible and visual warning if carbide supply, water level, or water temperature should deviate from normal. With standard regulating equipment, the MP-11 generator can be used to supply low-pressure acetylene to a piping system. Continuous operation reduces the number of generators needed in multiple generator installations. *Linde Company, Division of Union Carbide Corporation, Dept. RLC, 30 East 42nd st., New York 17.*

(*Continued on page 66*)

Diesel Days

By Gordon Taylor

SHORTLY AFTER a GP-7 unit had a new 18-kw unit-exchange auxiliary generator applied, it was noticed that the headlight lamps were burning out rather often. This naturally called for a check of the voltage regulator.

It was then discovered that the voltage was rather irregular, but not excessively high when the engine was operating in throttle positions, Nos. 1 to 7, inclusive. However, in throttle position No. 8, the voltage would go wild and rise to approximately 90 volts. The voltage regulator seemed to be operating properly, but it simply could not cut in enough resistance to weaken the field to bring the voltage down to 74 or 75 volts.

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

A careful check was made of the generator. It seemed to be in good condition. Its windings tested okay, and all wiring connections between the generator and regulator checked okay. The brush holders were set at the mark originally fixed by the builders, and the commutator showed no signs of sparking at the brushes.

A careful check was made of the voltage regulator. It was all right, except for the fact that it simply lacked range of capacity to control the voltage when the engine was in throttle No. 8. It could hold the voltage near 75 volts in throttle No. 7, but it lost control when the engine speed increased to throttle No. 8.

There was a locomotive standing on the next track, so the following test was made: The voltage regulator on the unit in trouble was disconnected from its generator and connected up with the generator on the neighboring unit. It controlled the neighboring generator correctly.

The voltage regulator on the neighboring unit was connected to the generator on the unit in trouble, and it too failed to control the voltage of the auxiliary generator when operating at throttle No. 8 speed.

A spare auxiliary generator was applied to the unit in trouble and everything was right. The voltage regulator controlled the voltage of the spare generator at all engine speeds.

The trouble was clearly in the first generator, but what was wrong? A close comparison of the two generators showed a difference in brush holder location.

On the generator in trouble, the brush holders were found shifted back *against* the direction of rotation the width of two commutator bars. With brushes in that position, the voltage was erratic, but it stayed reasonably close to 74-75 volts at throttle positions lower than throttle No. 8. When the speed was stepped up to throttle No. 8, the voltage would rise to approximately 90 volts, despite the best efforts of the voltage regulator.

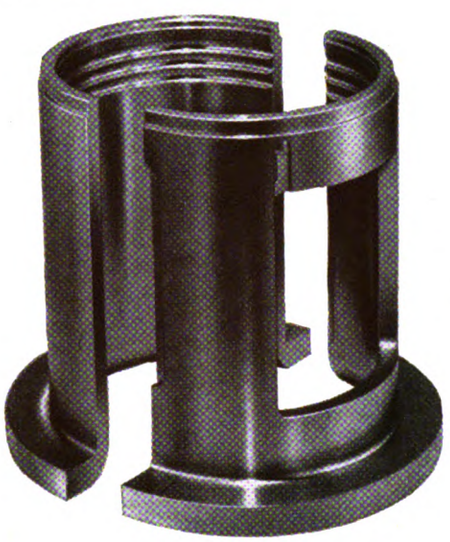
The brush holders on the troublesome generators were shifted *forward* in the direction of rotation the width of two commutator bars. That corrected the trouble.

The confusing thing about this case was the fact that the generator in trouble had recently been tested by the manufacturers, and the brush holder position was not suspected. The fact that commutation was sparkless also seemed to confirm that nothing could be wrong with the brush holder position.

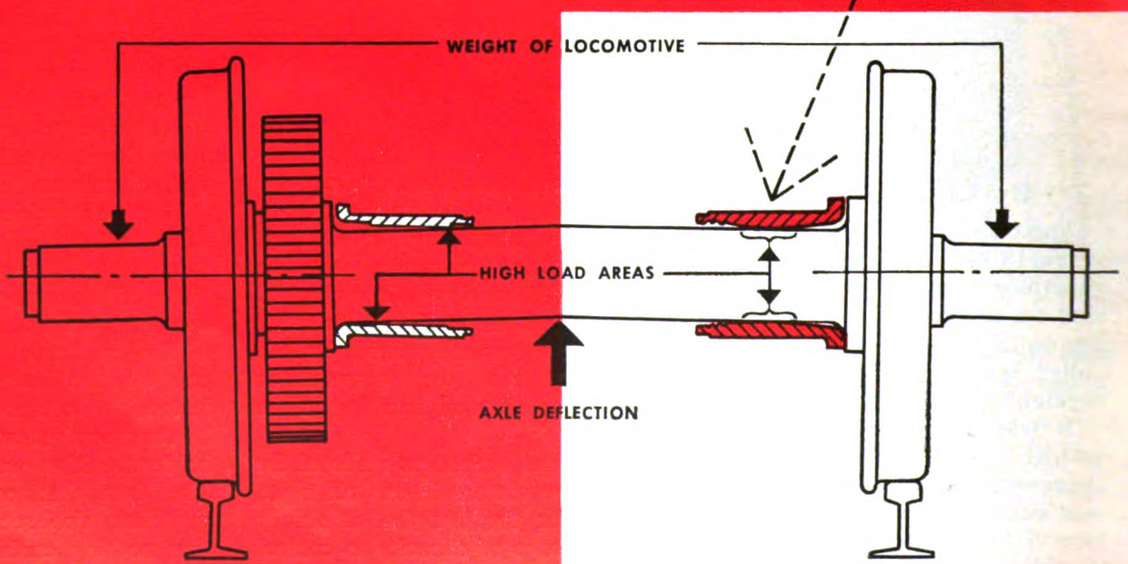
Further investigation revealed that two generators had been received from the manufacturer with improper brush holder settings. In one case, the generator was found to have no marks that would indicate the proper brush holder position. In another case, the generator had two sets of punch marks, but the brushes were set at the wrong mark.

Now, from ELECTRO-MOTIVE

1 TRACTION MOTOR SUPPORT BEARINGS WITH EXTRA LIFE, HOURGLASS DESIGN



Electro-Motive modified hourglass bore design compe
sates for axle deflection to eliminate end-loading a
provide better lubrication. Result: A longer service l
than straight-bore bearings.



STRAIGHT-BORE BEARINGS
are heavily loaded at the ends which prevents adequate lubrication. Because of this, straight-bore bearings are subject to stresses that start "shell-outs" or fatigue cracks which shorten life or cause premature failures.

MODIFIED HOURGLASS BORE BEARINGS
fit the normally deflected axle to provide a greater bearing surface, eliminate end loading and permit thorough lubrication. In addition, special circular grooves in the Electro-Motive bearing return excess oil (lost on straight-bore bearings) to the axle reservoir to be used over and over.

2 A NEW SALES-EXCHANGE PLAN TO CUT REPLACEMENT COSTS

In addition to the initial low cost and extra life of Electro-Motive traction motor support bearings, a new sales-exchange plan has been established that can lower your cost as much as seven per cent.

Among the plan's many features is a new and generous "scrap allowance" for any worn traction motor support bearings you turn in on the purchase of Electro-Motive hourglass bearings.

Before you order traction motor support bearings again, be sure to check the advantages of the Electro-Motive hourglass bearing and the savings you can get under our new sales-exchange plan. For complete details on both, see your Electro-Motive representative.

Nine convenient on-line warehouses for fast delivery on parts and Unit Exchange components.

Los Angeles, Calif.
Emeryville, Calif.
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(factory and parts center)
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Jacksonville, Fla.
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GENERAL MOTORS LOCOMOTIVES

ELECTRO-MOTIVE DIVISION
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IN THE BEATTY FAMILY
OF FINE METAL-WORKING
EQUIPMENT YOU'LL
FIND MACHINES FOR
BENDING STRAIGHT-
ENING — SHEARING
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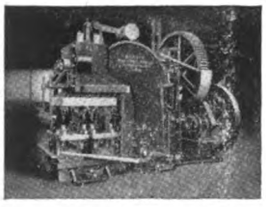
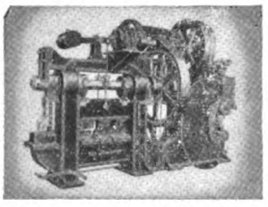
ING PRESSING
AND NOTCHING



BEATTY Heavy Duty Punch handles 65 ft. stock. Punches webs and flanges.

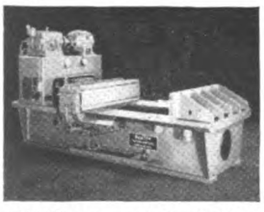


BEATTY Co-Pun-Shear copes, punches, shears without changing tools.

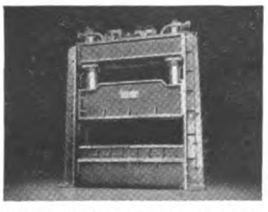
Got a metal-working problem? Chances are, from the Beatty family of metal-working equipment you will find the *right* machine for the job. Right in cost . . . right in production speed . . . right in engineering concept.

Beatty machines have an enviable reputation for accurate, dependable, day-in-day-out operation. They're built rugged and rigid to keep downtime at a minimum — boost production. Don't let obsolete equipment rob *you* of production and profits. Get all the information on a Beatty installation to fit your needs . . . talk it over with a Beatty engineer.

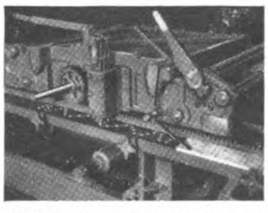
BEATTY MACHINE & MFG. CO.
962 150th St. Hammond, Indiana



BEATTY Horizontal Hydraulic Bull-dozer for heavy forming, flanging and bending.



BEATTY Vertical Hydraulic Bull-dozer for hot and cold pressing and forming of heavy metal.



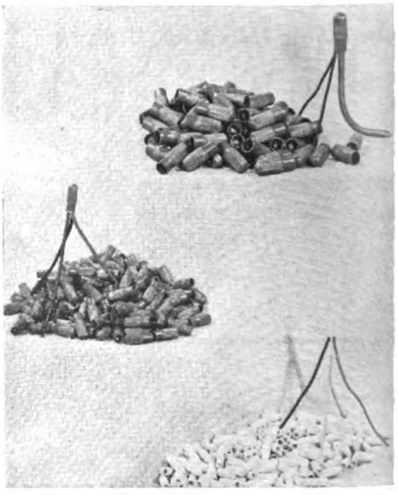
BEATTY Spacing Table handles beams, channels and plates with speed and precision.

(*Continued from page 62*)

Air-Powered Screw Drivers, Nut Setters

This series of air-operated screw drivers and nut setters are powered by the Keller Tool No 2 air motor. The 12A-2 series screw drivers and 16A-2 series nut setters have a complete speed and torque range from high speed, low torque to high torque, low speed.

The tools feature interchangeable gears, spindles and chucks which afford quick conversion to various jobs, side-air intake and large exhaust ports, one-shot lubrication with flush-type fitting, capacities up to 5/16 in. Straight-drive, positive and cushion clutches, with holders for 1/4 and 7/16 in. hex socket drives are available. *Gardner-Denver Company, Dept. RLC, Quincy, Ill.*



Spring Wire Connectors

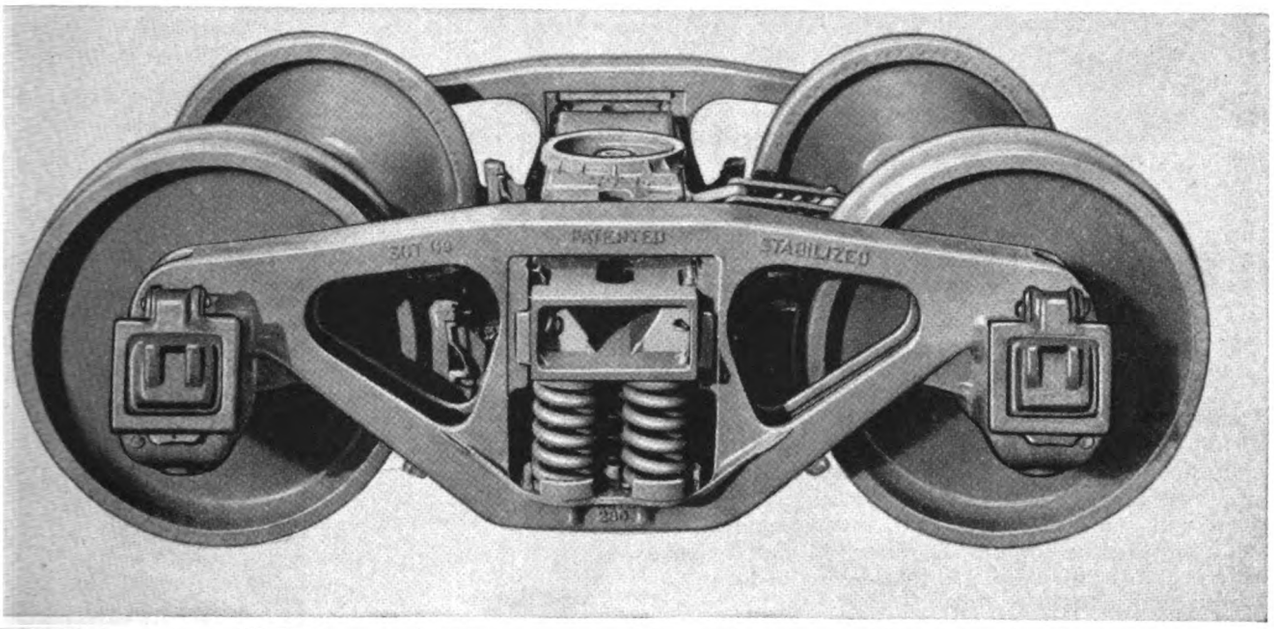
Two new color-coded, pre-insulated spring type wire connectors have been added to the 3M line of Scotchlok brand electrical connectors making more than 400 wire combinations using only three connector sizes.

The Type Y (yellow) connector will

(*Continued on page 68*)

World's Easiest Truck Servicing

BEGINS WITH



BARBER

STABILIZED TRUCKS

Less service time and costs add up to important savings. So, experienced freight car designers naturally "Begin With Barber Stabilized Trucks." Because: When necessary to service Barber parts, friction castings, wear plate and side springs are removed and replaced *5 to 10 times faster* than those of other trucks . . . can be inspected at a quick glance. Result of the *more than 475,000 Barber car sets sold,* none has ever worn out!

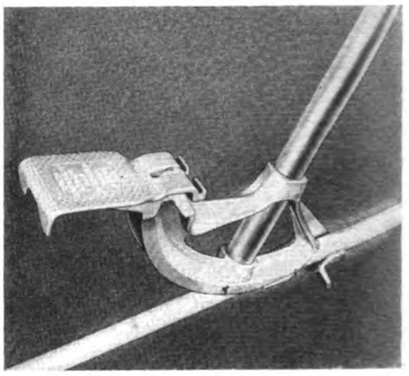
Standard Car Truck Company, 332 South Michigan Avenue, Chicago 4, Illinois. *In Canada:* Consolidated Equipment Company, Ltd., Montreal 2, Quebec.

(Continued from page 66)

splice solid or stranded wires from No. 12 through No. 18; the Type R (red) No. 10 through No. 16; and the Type B (blue) No. 6 through No. 12. The connectors consist of a cone-shaped coil spring within a steel shell to prevent crushing in crowded junction boxes. The vinyl insulating jacket—molded over the unit—features a triangular cross-section for a better finger grip during application. It also includes a skirt at the bottom to protect the wires and prevent flashover.

In use, the connectors are simply twisted on the ends of the wires to be spliced—the cone-shaped spring construction providing threads and gripping the wires firmly under constant, live spring action.

Minnesota Mining & Manufacturing Co., Dept RLC, 900 Bush st., St. Paul 6, Minn.



Foot Booster Pipe Bender

An addition to the Powr Jack line of conduit benders bends ¾-in. Sherarduct and other types of rigid steel conduit, as well as one-in. Xduct Junior metallic tubing.

The tool utilizes a two-position foot treadle booster step which provides foot leverage to assure smooth, true radius bends. The PJ100 bender, of pearlitic malleable iron, is finished in aluminum paint, with bright red symbols for precision bending. For safety, the tool is pre-stressed at the factory to a pressure of 16 tons. *National Electric Products Corp., Dept. RLC, Pittsburgh.*

Portable Hand Lamps

This explosion-proof hand lamp, uses a 100-watt A-21 lamp, and is designed for rugged service. All exposed metal parts are made of non-sparking aluminum and the insulated handle is made of high impact-resistant plastic. The globe is

(Continued on page 70)

WHY have hot boxes increased 55.8% since 1954?

The A.A.R. figures are accurate and clear! A total of 142,245 hot boxes experienced in the first eight months of 1957 against only 91,277 in the like period of 1954! What's responsible? Lack of proper supervision? Lack of proper maintenance procedures? Poorly renovated thread Packing? Or the multitude of gadgets and pads introduced in those years?

The answer is probably a combination of all these factors. The fact remains, however, that in 1954, when journal boxes were packed with new and renovated thread Packing according to A.A.R. specs, there were almost *51,000 fewer hot boxes* than this year! Think of the savings, had this record been maintained!

There's an even more basic savings to consider. As an example:

2,000,000	Freight cars packed with substitutes such as pads, etc., not yet proved *in service*, @ an average price of about $40.00 per car set	**$ 80,000,000.**
2,000,000	Freight cars packed with approved A.A.R. Journal Box Packing @ approximately $4.90 per car set	**$ 9,800,000.**
	Savings	**$ 70,200,000.**

It all adds up to real economy when you stick to tried-and-true measures. In short, there is no economical replacement for A.A.R. Approved Journal Box Packing.

INSTITUTE OF JOURNAL BOX PACKING MANUFACTURED ACCORDING TO A. A. R. SPECIFICATIONS MEMBER THREAD MACHINERS INC.

INSTITUTE OF THREAD MACHINERS, INC.

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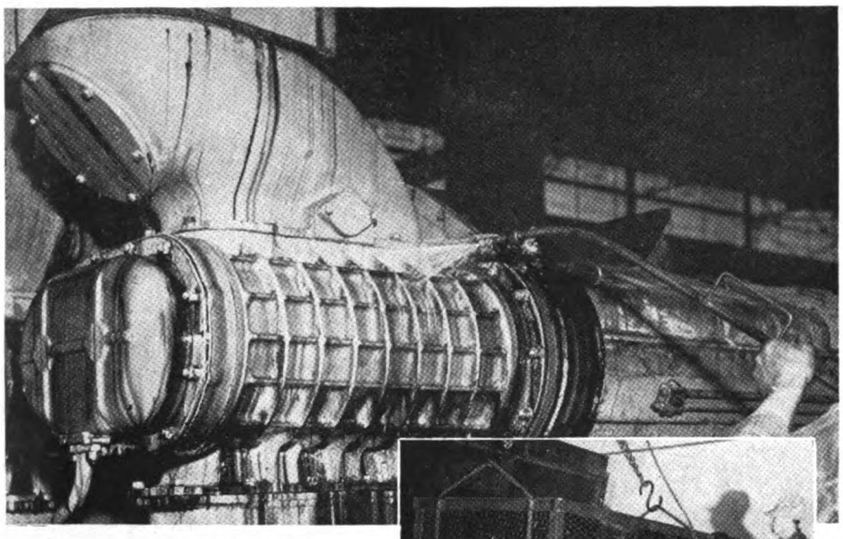
Atlas Processing Corp., New York, N. Y.
Meyer Burstein & Sons, Neenah, Wisconsin
Dallas Waste Mills, Dallas, Texas
The J. Milton Hagy Waste Works, Philadelphia, Pa.
John J. McGrath, Inc., Philadelphia, Pa.
Miller Waste Mills, Inc., Winona, Minn.
National Waste Company, New York, N. Y.
O'Neill Brothers, Inc., Philadelphia, Pa.
The Pittsburgh Waste Co., Inc., Swissvale, Pa.
Riverside Mills, Augusta, Ga.
Royal Manufacturing Company, Perth Amboy, N. J.
Southland Manufacturing Co., Inc., Norfolk, Va.
Twin City Textile Mills Waste Co., St. Paul, Minn.



keep 'em clean
at
LOWER COST
with

LIX DIESEL KLEAN HEAVY

For periodic surface cleaning that keeps diesel locomotives shining bright . . . and for overhaul cleaning of all diesel parts such as pistons, bearings, liners, filters, lube oil coolers, injection nozzles, brush holders, airbrake assemblies, etc. . . . LIX Diesel Klean Heavy is FAR MORE ECONOMICAL in end results. It cleans FASTER . . . cleans BETTER . . . cleans at LOWER COST PER JOB. No *scraping* or *brushing* is necessary . . . Lix *soaks* away all grit, grease, grime and caked carbon. It leaves no granular deposits . . . reduces after-rusting . . . is harmless to all metals during cleaning cycle . . . and all metals can be cleaned in same tank. Lix is SAFER, too—is of low toxicity, is not a fire hazard.

Prove to yourself how you can reduce diesel cleaning costs! WRITE, WIRE or PHONE for a no-cost, no-obligation Lix DEMONSTRATION in your own shop!

Manufacturers of Lix Diesel Klean Heavy and Lix Electric Equipment Cleaner

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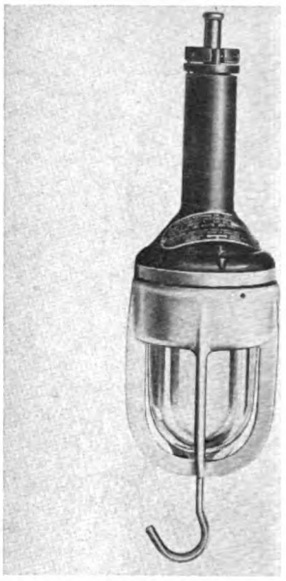
(OF MISSOURI)
300 WEST 80TH, DEPT. RL 2
KANSAS CITY, MISSOURI

PRODUCTS OF RESEARCH

"Leadership in Industrial Cleaning"

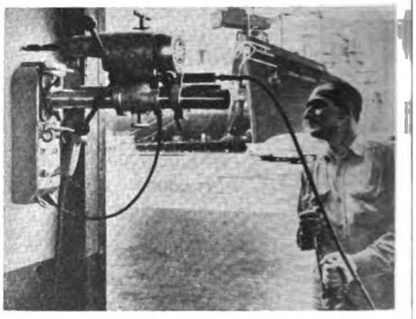
(*Continued from page 68*)



tempered glass which is heat and impact-resistant.

The threaded guard secures and seals the globe to the holder which is threaded to the insulated handle. For re-lamping, the metal assembly is removed as a unit. All threaded joints are locked to prevent accidental loosening.

Portable cord is installed or replaced by a 3-pole connector provided within the handle. One pole is used for ground. *Pyle-National Co., Dept RLC. Chicago, 51.*



Magnetic Drill Press

This 1¼ in. Magnetic drill press designed for continuous operation on either a-c or d-c, is said to drill holes within 1/64 in. accuracy and will not overheat, thereby reducing its magnetic hold. Features include a drill point locator for exact positioning, two piece construction for ease of handling, and a remote control hydraulic power feed which enables the operator to drill with little effort and to stand clear of the work.

(*Continued on page 72*)

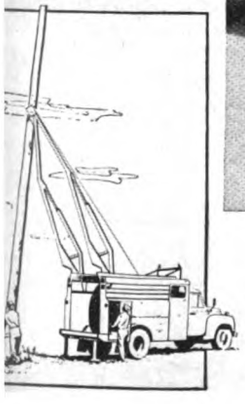
SHELBY SEAMLESS TUBING helps "Pole-Master"* handle poles like matchsticks

THE POWERFUL, two-legged boom of this "Pole-Master" Hydraulic Derrick is made of cold drawn tubes of USS Shelby Seamless Mechanical Tubing. Capable of handling poles up to 75 feet in length with relative ease, the boom is activated by two hydraulic cylinders, also of Shelby Seamless, which are powered by a heavy-duty hydraulic pump. The derrick has an operating arc of more than 180 degrees, and is designed to "set" poles or "pull" them from the ground. The "Pole-Master" can be used under the most severe work conditions in any weather or climate.

Here is an application in which Shelby Seamless Tubing really excels, for it brings into play all the desirable qualities that Shelby Seamless possesses—high strength, uniformity, shock absorbency, dimensional accuracy, lightness and workability.

Produced to exacting standards by the world's largest manufacturer of tubular steel products, Shelby Seamless is available in a wide range of diameters, wall thicknesses, various shapes and steel analyses. You are invited to call on our engineers for assistance. They will be happy to submit recommendations based on a study of your particular requirements.

**Manufacturer's name on request.*



WALLS WITHOUT WELDS

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

SHELBY SEAMLESS MECHANICAL TUBING

A PRODUCT OF NATIONAL TUBE

What's New

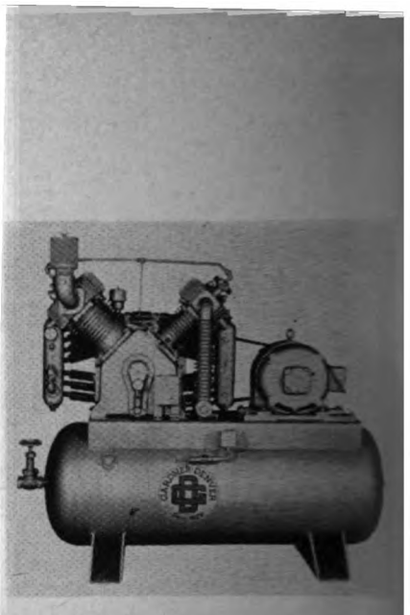
(*Continued from page 70*)

The magnetic base is detachable from the drilling unit to cut in half the weight that must be supported as the unit is secured in position. In attaching the base to the work surface, the drill point locator makes it possible to align immediately for accurate drilling. A built-in headlight throws a direct light beam at the center of the hole. Magnetic contact is controlled by a safety grip trigger switch on the base.

Remote control hydraulic power feed permits easy control when drilling overhead, in a sidewall, or in the center of a large area. Drilling capacity is 1¼ in. of steel, with tapping and reaming capacities of 1 in. in light steel and ¾ in. in heavy steel. Length of drill stroke is 15 in. Direct magnetic pull is 3,500 lb. *Black & Decker Manufacturing Co. Dept. RLC, Towson 4, Md.*

Air Compressor

The ADL-1000 extra capacity compressor, according to the manufacturer, eliminates the need to buy a second compressor when only slightly larger air capacity is needed.



This two stage, air-cooled, 20-hp two-cylinder vertical compressor has a piston displacement of 100 cfm at 870 rpm in continuous service, and discharge pressure up to 150 psi. On intermittent service, it is suitable for discharge pressure as high as 250 psi. *Gardner-Denver Company, Dept. RLC, Quincy, Ill.*

Low-Cost Breaker Enclosure

A compact handle-through-cover enclosure for GE 2-pole and 3-pole plug-in Type TQL circuit breakers has been made available. With 240-volt a-c, 100 through 50-amp breakers, the enclosure can be used for individual or centralized control of equipment. It can be used as a main disconnect for remotely located branch circuit panels and to protect insulated conductors in feeder and branch circuits from overcurrent. It is furnished for either flush or surface mounting in a light grey.

It features insulated groundable neutrals, spacious wiring gutters, ample knockouts, provision for wire sealing covers and padlock locking. *Circuit Protective Dept. General Electric Company, Dept RLC, Plainville, Conn.*

(*Continued on page 74*)

THE ANSWERS TO YOUR CLEANING PROBLEMS

FREE

in a single, convenient cleaning handbook

Modern, efficient, safe cleaning methods are vital to today's railway systems . . . They can spell profit or loss —success or failure.

Are you sure that your present cleaning methods, materials and machines are the best possible for safe, efficient operation? If not, you owe it to yourself to write today for free, complete information on the successful methods now in use by the leading railroads the country over and backed by the proven know-how of Magnus, the one source for all railroad cleaning materials.

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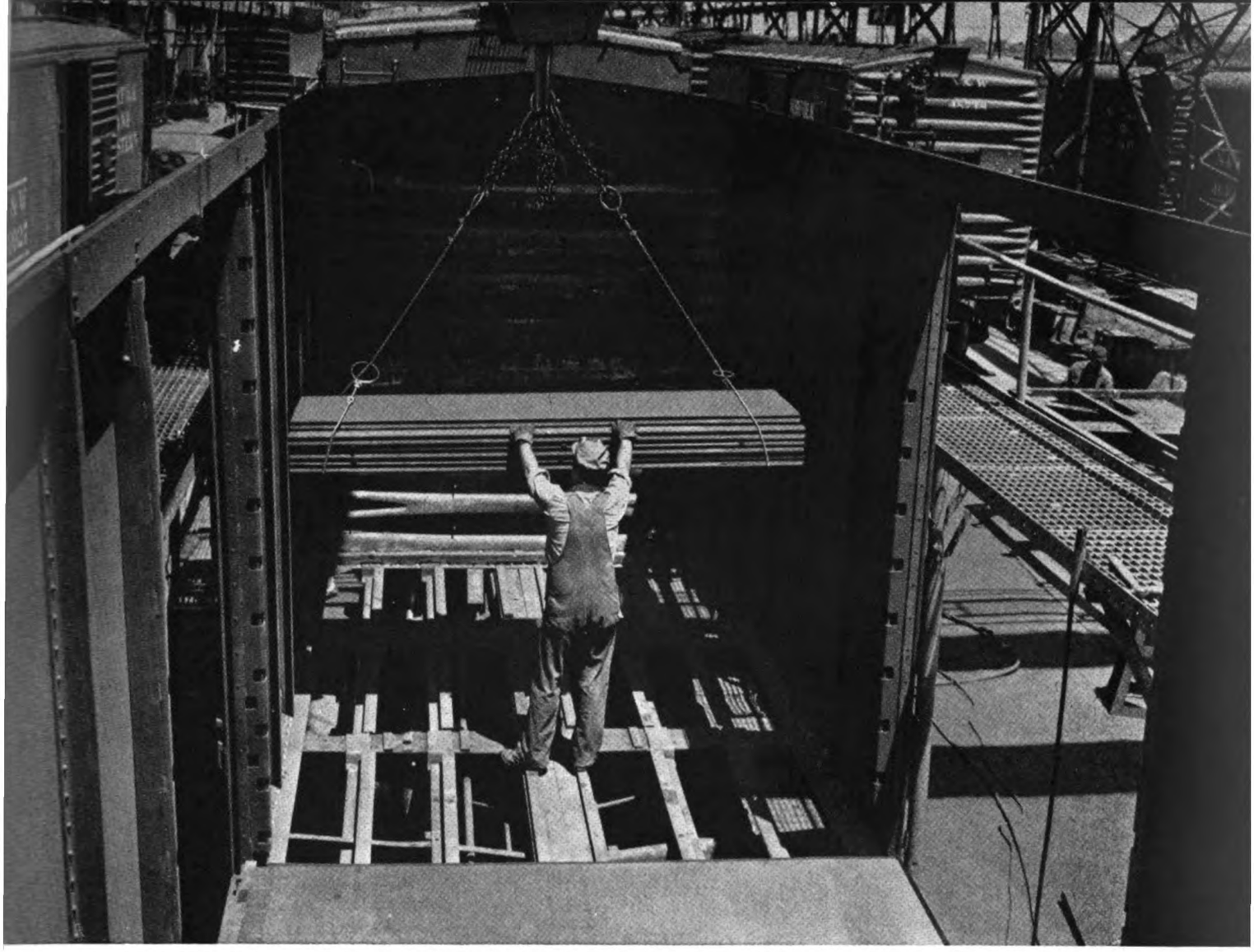
magnus a world-wide organization specializing in cleaning and protection of all surfaces.



One of 50 freight cars receiving heavy repairs with N-S-F *at the Portsmouth, Ohio, shops of the Norfolk and Western.*

I-S-F® helps N&W RY PRECISION TRANSPORTATION PREPARE for the future

Economy-minded railroads are building longer life and better service into their repaired cars by using NAILABLE STEEL FLOORING. Years of service prove that N-S-F not only eliminates floor repair problems, but adds structural strength to the underframe, and lasts as long as the car itself. With N-S-F Class A cars are available to shippers for all ladings.

For complete performance and cost studies on the use of N-S-F in heavy repaired cars, contact our nearest representative in Chicago, New York, Philadelphia, St. Louis, Cleveland, San Francisco, Minneapolis, Atlanta. In Canada, N-S-F is made and sold by International Equipment Co., Ltd., Montreal.

W heavy repaired boxcar with N-S-F *installed.*
proof surface adds personnel safety.

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HOW-TO-DO-IT ARTICLES

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Years of experience are packed into this new 6-article series — each an invaluable guide for keeping commutators and slip rings at peak performance.

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Company_____
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What's New

(*Continued from page 72*)

Electric Chain Hoist

This electric chain hoist is said to be adaptable for utilization on production lines, over machine tools, or in any shop location where space is at a premium. The device is available in two types of reeving—the 300-2000 lb, single chain unit and the 3000-4000 lb capacity, double-chain unit.

Operation has been arranged for one-hand control with clearly marked handles for up or down travel of its hook. Control ropes are attached to a control lever which activates a controller to raise or lower the hook and also act as the limit switch control. Double braking action provides built-in safety. The spring operated motor automatically and instantly locks when the control cord is released. A chain lubricator furnished with the device, lubricates the chain as it passes over the load wheel.

Motors for the unit are available for operation on standard voltages and frequencies: 115 volts, single phase, 60 cycles; 230 volts, single phase, 60 cycles; 220/440 volts; reconnectable three phase, 60 cycles; and 550 volts, tree phase, 60 cycles. *Wright Hoist Division, American Chain & Cable Co., Dept. RLC, York, Pa.*

Zippertubing For Harnesses

Zippertubing for wiring harnesses and for enclosing and protecting multiple

(*Continued on page 76*)

America's foremost engineered lettering tools

DN

designed to reduce your present costs **50 to 80%**

Used today by 1/3rd of the Nation's leading Railroads . .

Spray it® **STENCILS**

PRESSURE SENSITIVE TYPES

Easy to apply. No skill required. Produces the most accurate and durable type of lettering, numerals, medallion, and other types of markings. Adds long life to your identification or advertising on all your equipment . . .

Whatever your lettering problems may be regarding identification, advertising, reflective or non-reflective, the DEMP-NOCK LETTERING SYSTEMS can help you get the job done in less time.

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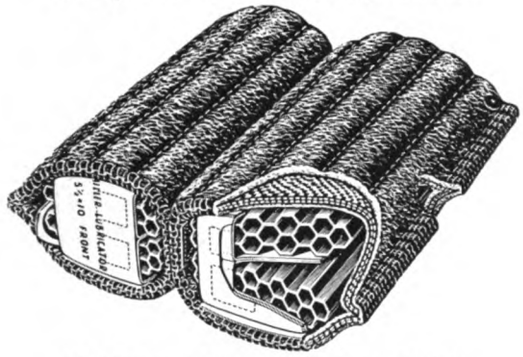
FOR PROGRESSIVE RAILROADING

145,000 CARSETS TO DATE



MILLER LUBRICATOR PADS

MUCH LOWER COST

APPROX. $7 PER FREIGHT CAR YEAR

(6 year life-expectancy for $40)

YOU REDUCE YOUR YEARLY EXPENDITURE

FOR PADS BY $700,000 PER 100,000 CARS OWNED. A 50% SAVING BY USING THE DURABLE LONG-LIVED PRODUCT.

MILLER PADS ARE YOUR SOUND INVESTMENT BECAUSE:

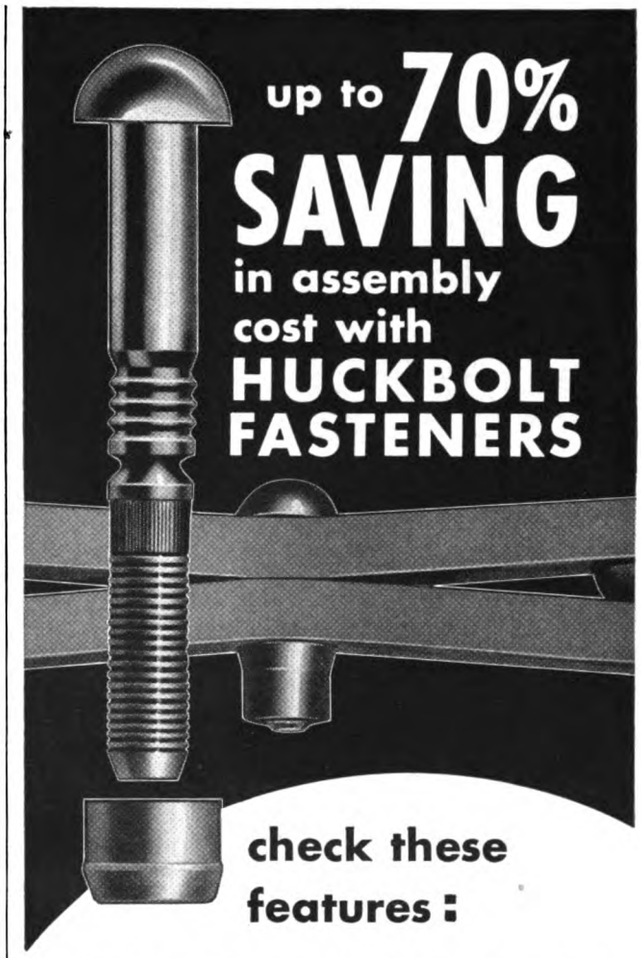
- Pads with 4 years service are in good condition.
- 135,000 miles on one side of pad—opposite side still unused.
- Excellent condition after reclamations.
- Not destroyed by front collar.
- Can be removed without damage even when frozen without jacking.

10,000 CARSETS ALWAYS ON HAND
$40 PER CARSET IN U.S.A.

MILLER LUBRICATOR CO.

Winona, Minnesota

In Canada: Napanee Iron Works, Napanee, Ont. and Montreal, Que.



check these features:

- High shear and tensile strength.
- Uniform high clinch and preload.
- Positive mechanical lock.
- Excellent sealing qualities.
- Fast, quiet installation.
- Low installed cost.
- Easy removal.
- Your choice of materials and head styles.

Huck fasteners offer you maximum uniform strength, high production, quiet application at advantageously low installed cost. There is a HUCK fastener to fill your need. Write for our condensed Commercial Catalog (No. 8-414) or a HUCK Fastener Consultant will call at your request.

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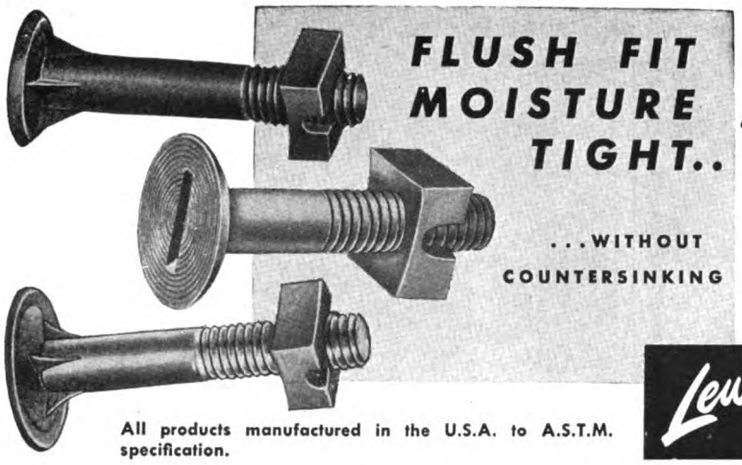


Lewis sealtite car bolts

Each Lewis Sealtite car bolt has special "wood engineering" beveled head for flush, moisture tight, fit . . . without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning . . . slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

All products manufactured in the U.S.A. to A.S.T.M. specification.

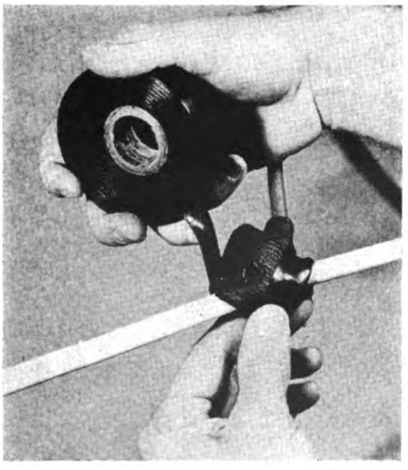
Lewis BOLT & NUT COMPANY
504 Malcolm Ave. S. E.
MINNEAPOLIS 14, MINNESOTA

LOOK FOR THIS STAMP OF U QUALITY

(*Continued from page 74*)

runs of wire consists of a plastic jacket with a zippy-type closure.

The zipper pull-tab may be unzipped and re-used where required or permanently sealed. When sealed, the seam will withstand a linear strength test of 45 psi. Sizes range from ⅜ in. in diameter and larger in increments of ⅛ in. The tubing is available in nine different colors and in continuous lengths from 20 to 1,000 ft. *Zippertubing Company, Dept RLC, 8th and S. San Pedro st., Los Angeles.*



Joint Pad Protects Insulation

A method of padding the sharp corners on electrical connectors, particularly suited to locomotive wiring, is illustrated. It saves both time and tape for making a splice or cushioning critical spots. By forming a cross with two pieces of Scotchfil brand insulating putty, the connector is enclosed in a padding of the putty and ready for wrapping.

About 15 per cent of the average time required for insulating splices is saved along with about 50 per cent of the tape normally used. The method also provides a standard which reduces variables in splice quality. *Minnesota Mining & Mfg. Co., Dept. RLC, 900 Bush ave., St. Paul 6, Minn.*

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

DIESEL ENGINES.—8-page two-color booklet, "The Switch to Higher Profit," describes uses of Caterpillar diesel engines on railroads, including crane power, air conditioning and locomotive prime mover, with on-the-job illustrations. (Write: *Caterpillar Tractor Company*, Dept. RLC, Peoria, Ill.)

STAINLESS STEEL. 32-page catalog describes chemical composition, strength factors, physical properties and typical applications for a broad range of stainless-steel types, including the 200, 300 and 400 series. Includes also forging ingots and rolled-in surface patterned stainless steels. (Write: *Advertising Department, Sharon Steel Corporation*, Dept. RLC, Sharon, Pa.)

OXWELD NOZZLES.—12-page folder (Form 1024) describes and illustrates some of the production steps that go into manufacture of Oxweld cutting nozzles. (Write: *Linde Company, Division of Union Carbide Corporation*, Dept. RLC, 30 East 42nd st., New York 17.)

STRADDLE CARRIER.—4-page booklet gives complete specifications and operating advantages of the Series 71 straddle carrier of 12,000-lb capacity. Load height and width, bolster length, inside height and width, overall width and weight given for each of nine models. Sketches illustrate turning radius. (Write: *Ross Carrier Division, Clark Equipment Company*, Dept. RLC, Benton Harbor, Mich.)

SILICONES.—16-page 1958 Dow Corning Reference Guide (Code 1-113) describes over 150 commercially available Dow Corning silicone products. Contains detailed charts, tables, graphs, and data on properties and performance, also illustrated examples on how silicones can cut costs. Cross indexed. (Write: *Dow-Corning Corporation*, Dept. RLC, Midland, Mich.)

GRINDING AND BORING SPINDLES.—8-page booklet illustrates and describes Ex-Cell-O Precision grinding and boring spindles, also a line of standard spindles for use as original equipment by machinery builders or as replacement spindles to improve performance of grinders and boring machines in use. (Write: *Ex-Cell-O Corporation*, Dept. RLC, 1200 Oakman blvd., Detroit 32.)

WELDING SUPPLIES AND ACCESSORIES.—48-page catalog (Form ADC 848B) contains complete information on ferrous and non-ferrous welding rods for oxyacetylene welding and Heliwelding; welding and brazing fluxes and their applications; aluminum welding fluxes; Aircosil silver brazing alloys; brazing alloys; Jackson and Airco protective equipment; Jackson electrode holders and cable connectors; weld cleaning tools; etc. (Write: *Air Reduction Sales Company, a division of Air Reduction* Company, Dept. RLC, 150 East 42nd st., New York 17.)

LUBRICANTS.—16-page booklet, "Brooks E. P. Lubricants," describes a wide range of lubrication jobs and explains use of Brooks E. P. products in solving severe applications. Products detailed as to type and application. Continuing research program also described. (Write: *Brooks Oil Company*, Dept. RLC, 3304 East 87th st., Cleveland.)

SPRAYED METAL COATINGS.—8-page Bulletin 136 contains basic engineering data on wire and powder sprayed coatings of metals and ceramics.

METALLIZING MACHINE.—6-page folder describes the Metco Type K electronic machine for high-speed automatic operation in production, production salvage, or heavy maintenance work. (Write: *Metallizing Engineering Co.*, Dept. RLC, Westbury, L. I., N. Y.)

CLEANER, LONGER LASTING

Esso Diol RD crankcase oils meet the need of modern diesels for very effective and economical detergent lubricants that will provide maximum protection for sensitive engine parts.

Even after the most severe freight or passenger operation, engines using Diol RD are exceptionally clean. They show a minimum of carbon deposits in the piston ring zone... very little lacquer or varnish on piston skirts and exhaust valve stems. And Diol RD oils effectively prevent corrosion of the silver wrist pin bushings or alloy bearings.

The good oxidation stability of the base stock in Diol RD oils is bolstered by the detergent-inhibitor additive used. Result: greater mileage between oil changes, with consequent lower costs. For data or technical assistance call your local Esso office or contact: Esso Standard Oil Co., Railroad Sales Division, 15 W. 51st St., New York 19, N. Y.

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A Cut Above Average

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B. Taper Bridge Reamer (Spiral Flute)

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High grade small tools perfected through years of specialization.

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MUD RING REAMERS
EXTENSION REAMERS
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CHUCKING REAMERS
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PIN REAMERS
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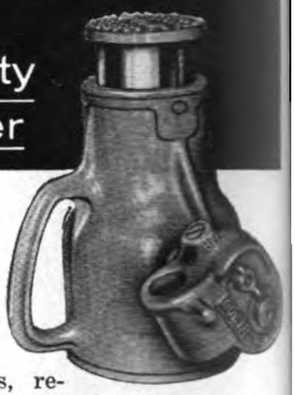
SPECIAL REAMERS

WAYNE TOOL CO.
Waynesboro, Pa.
SMALL W TOOLS

WESTERN LOCOMOTIVE and CAR JACK
lifts capacity
loads easier



WESTERN has made the first major change in Locomotive and Car Journal Jacks by adding TIMKEN tapered thrust roller bearings, replacing ball bearings. This major improvement means reduced friction, greater speed, easier operation and less maintenance . . . available in 25, 35 and 50 ton capacities. Aluminum or malleable steel housings available in 25 or 35 ton models.

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—ADVERTISERS IN THIS ISSUE—

Albertson & Co., Inc. 21
American Brake Shoe Company, Railroad Products Division 10, 11
American Steel Foundries 46, 47
Armco Steel Corporation 37

Beatty Machine & Mfg. Co. 66

Cincinnati Grinders, Inc. 24
Columbia Geneva Steel Division, United States Steel Corporation 71

Davis Brake Beam Company 40
Demp-Nock Co., The 74
Douglas Fir Plywood Association 50, 51

Electro-Motive Division, General Motors 64, 65
Esso Standard Oil Company 77
Ex-Cell-O Corporation 55
Exide Industrial Division—Electric Storage Battery Co., The 59

Gardner-Denver Company 62
General Steel Castings Company 19

Holland Company 20
Huck Manufacturing Company 75

Ideal Industries, Inc. 74
Institute of Thread Machiners, Inc. 69
International Nickel Company 43

Journal Box Servicing Corporation 4

Lewis Bolt & Nut Company 76
Lix Corporation, The 70

Magnus Chemical Co., Inc. 72
Magnus Metal Corporation 12, 13
Miller Lubricator Co. 75

National Carbon Company, Division of Union Carbide Corporation 15
National Electric Coil Company 3
National Malleable & Steel Castings Company ..... Inside Front Cover

Pullman-Standard Car Manufacturing Company 8, 9, 57

Standard Car Truck Company 67
Standard Oil of California 17
Standard Railway Equipment Manufacturing Company 22, 23
Stran-Steel Corporation, Unit of National Steel Corporation 73
Stratoflex, Inc. 68

Timken Roller Bearing Company, The ....Back Cover

Union Carbide Corporation, National Carbon Co. Div. 15
United States Graphite Company 7
United States Steel Export Company 71
United States Steel Corporation (NTD) 71

Waukesha Motor Company .....Inside Back Cover
Wayne Tool Company 78
Western Railroad Supply Co. 78
Westinghouse Air Brake Company 60, 61
Wine Railway Appliance Co., The 38, 39
Wyandotte Chemicals Corporation 52, 53

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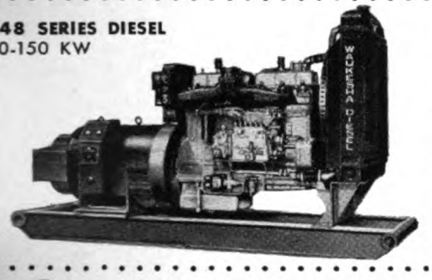
Industrial ENGINATORS®

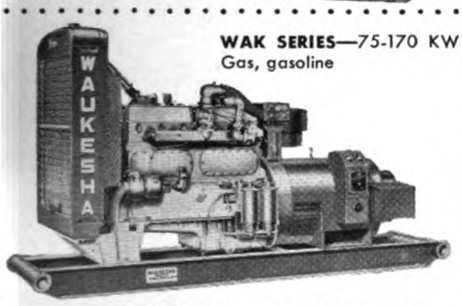
50-800 KW

NATURAL GAS • LPG • GASOLINE • DIESEL

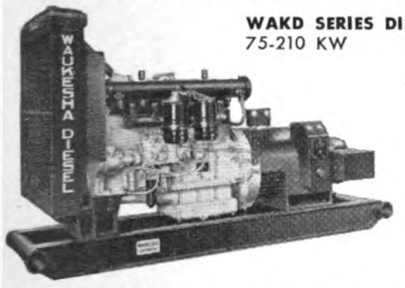
145 SERIES—45-110 KW
Gas, gasoline



148 SERIES DIESEL
50-150 KW



WAK SERIES—75-170 KW
Gas, gasoline



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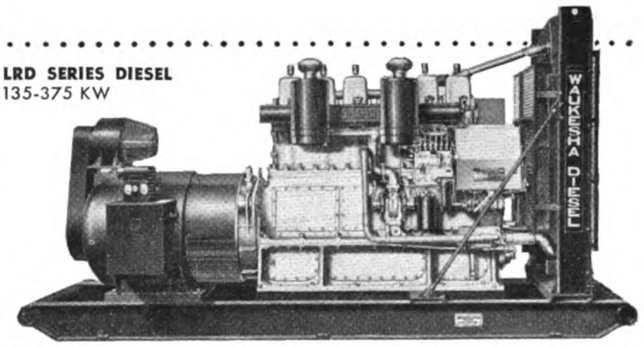
75-210 KW



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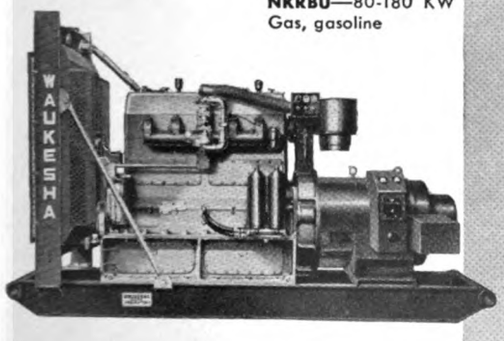
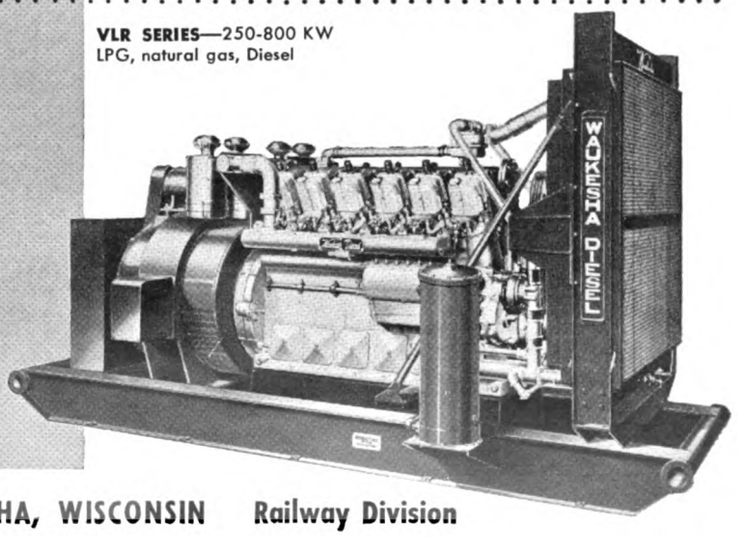
135-375 KW



NKRBU—80-180 KW
Gas, gasoline



VLR SERIES—250-800 KW
LPG, natural gas, Diesel

• Who builds these Waukesha Enginators? The same engineering organization who, ever since 1935, have made the Waukesha engine-driven railway equipment that supplies air conditioning and all electrical needs, and is now used by over 40 American railroads and the Pullman Co. For reliable performance on all fuels, these accurately balanced Waukesha engine-generator combinations supply smooth, steady power in continuous, intermittent and standby service.

WRITE for bulletins for these and other models

335-R

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN Railway Division

"I found substantial progress made toward solving a serious problem", says ACL's Rice

"WHEN I took over as president, I found the Coast Line had made substantial progress toward licking a serious problem—with 7,000 roller bearing cars," says W. Thomas Rice. "Reducing hot box delays helps us get more business. And by sharing a lot of these cars with other railroads, we're helping speed the day when all freight is 'Roller Freight'.

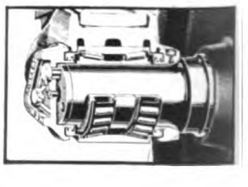
"By putting large numbers of roller bearing cars in interchange, the railroads are investing in their future together. It's the kind of teamwork that's made the railroads grow and prosper.

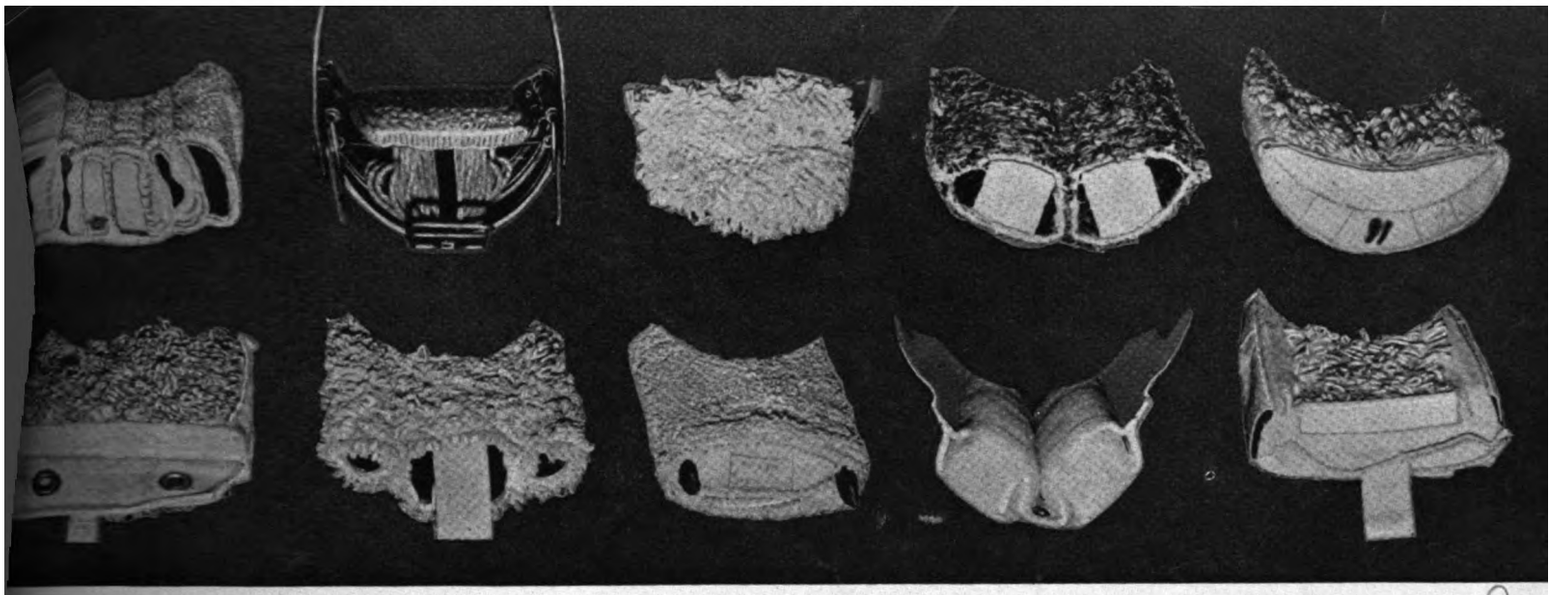
And even while helping all the railroads, we get most of the benefits from our 'Roller Freight' investment. Besides reducing the hot box problem, it helps us cut inspection time, save lubricant."

When all freight is "Roller Freight", America's railroads will save an estimated $224,000,000 annually in maintenance and operating costs. Tom Rice's ACL and 61 other railroads and private car owners can see that day coming. They've already put more than 24,500 cars on Timken® tapered roller bearings, about ½ of them in interchange.

The taper makes Timken the only bearing that delivers what you expect from a roller bearing. There's no lateral movement to pump lubricant through the seal. Positive roller alignment is assured. Timken bearings cut lubricant cost 95%.

That's why "Roller Freight" is rolling in interchange. Our booklet, "How America's Railroads Can Save $224,000,000 A Year", will tell you more. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".





Lubricators: What Is the Situation Now? . . . Page 32

RAILWAY LOCOMOTIVES AND CARS

A SIMMONS-BOARDMAN **TIME-SAVER** PUBLICATION

MARCH 1958

Electro-Motive's Newest Locomotives . . . Page 29

APR 2 1958

MAR 28 58

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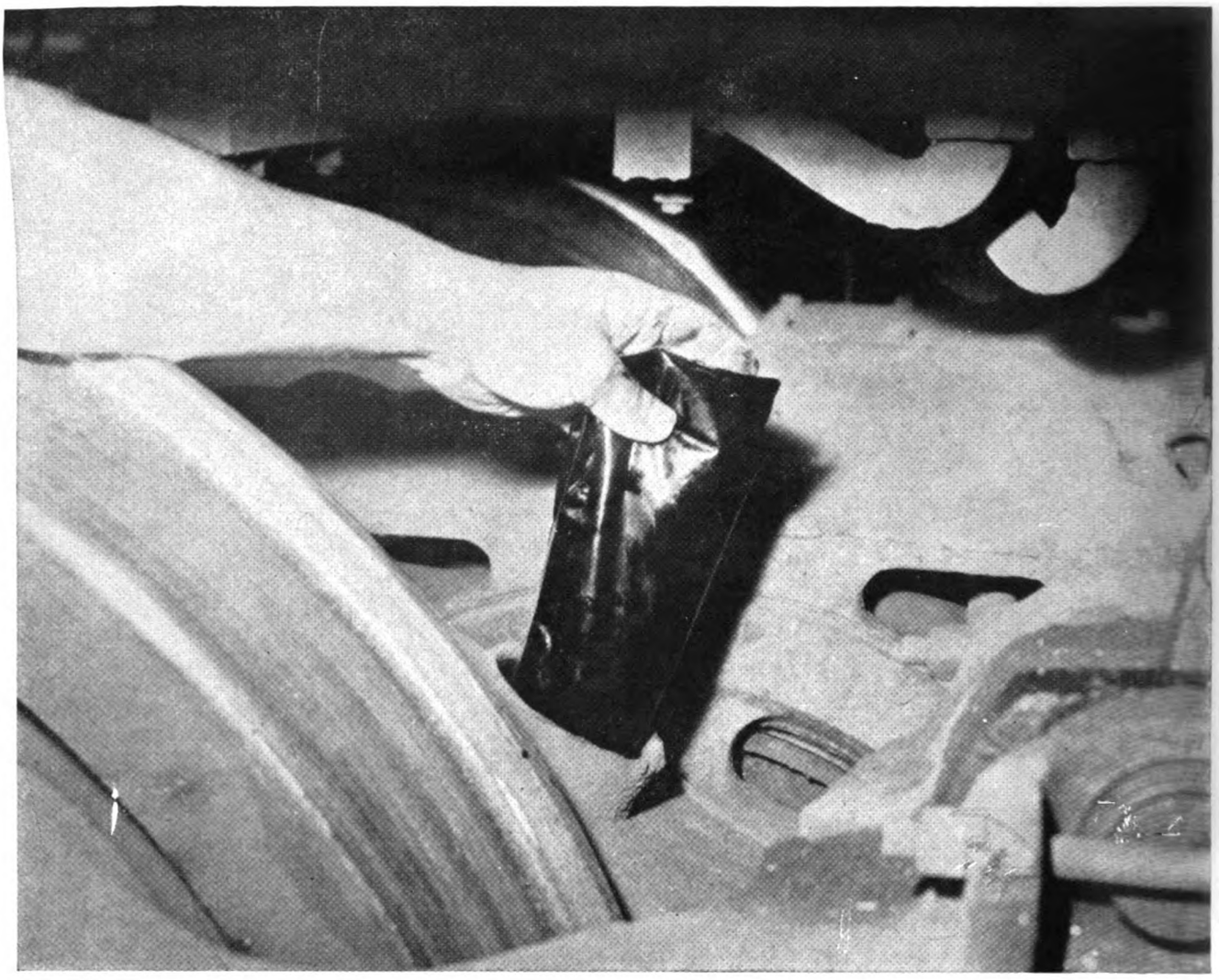
FOUNDED 1832

AMERICA'S OLDEST TRADE PAPER



It's "in the bag" for easy application

...Texaco Crater

Texaco Crater is now available in 1-lb. polyethylene bags —48 bags to the case—clean, convenient, economical. This is the same reliable product that has long been giving traction motor gears outstanding protection in all types of Diesel gear cases. But now—make-up servicing is so fast and easy—just drop in bag and all.

Time and again, comparative road tests have proven that Texaco Crater gives more miles per pound. Now, with in-the-bag application, over-all lubricating costs can be lowered, too—because in over-the-pit servicing, it's easy to control quantity, eliminate all waste, sharply reduce application time.

For full information, call the nearest Texaco Railway Sales Office in New York, Chicago, San Francisco, St. Paul, St. Louis, or Atlanta. Or write:

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The Texas Company, *Railway Sales Division,* 135 East 42nd Street, New York 17, N.Y.

TEXACO

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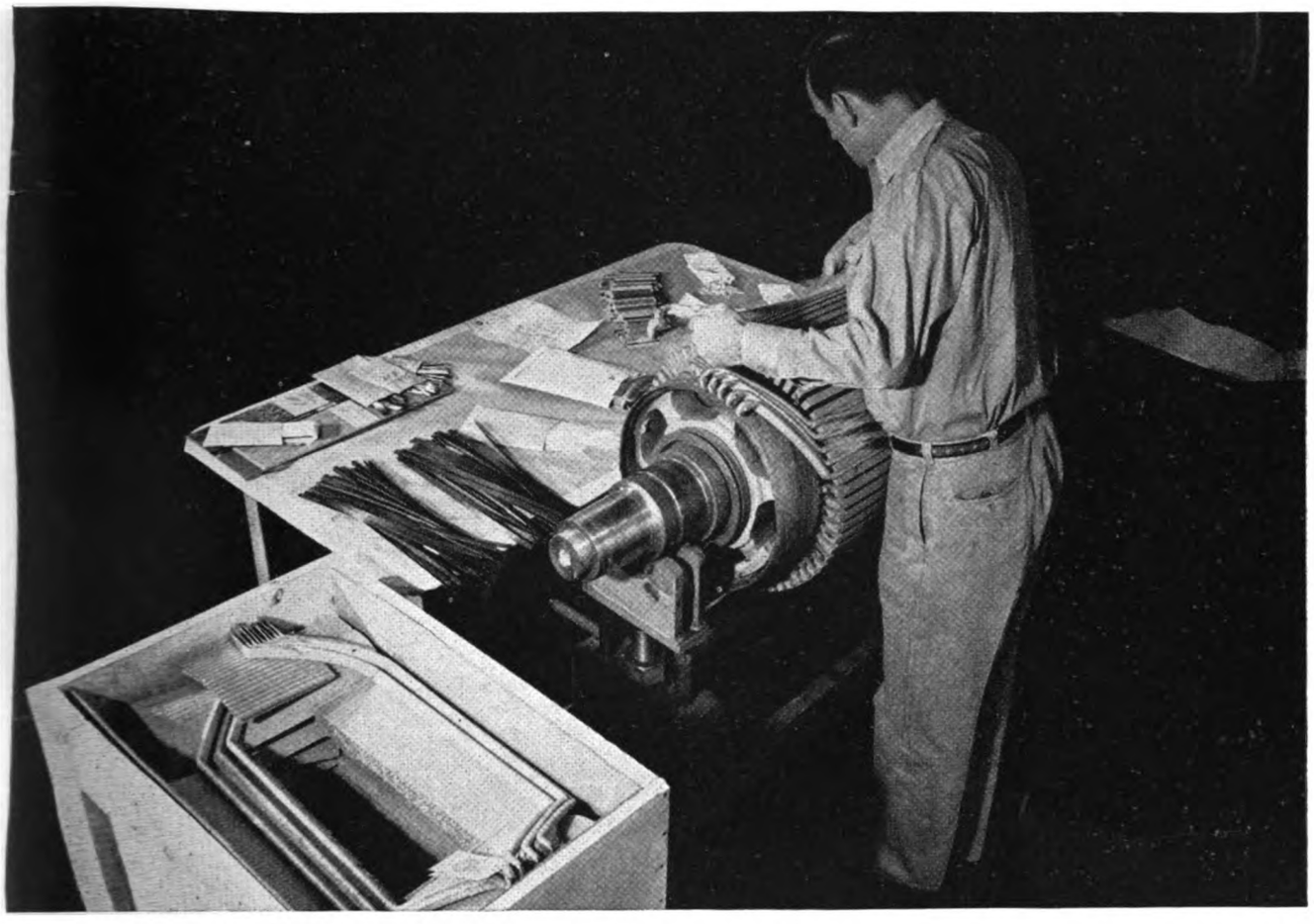
TEXACO Railroad Lubricants

AND SYSTEMATIC ENGINEERING SERVICE

IN ALL 48 STATES



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4. Comprehensive, easy-to-follow placement and connection diagrams clearly explain the best winding procedure and technique.

For complete details on kits to meet *your* motor maintenance requirements, give your nearby National field engineer a call or drop us a line.

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COLUMBUS 16, OHIO, U. S. A.

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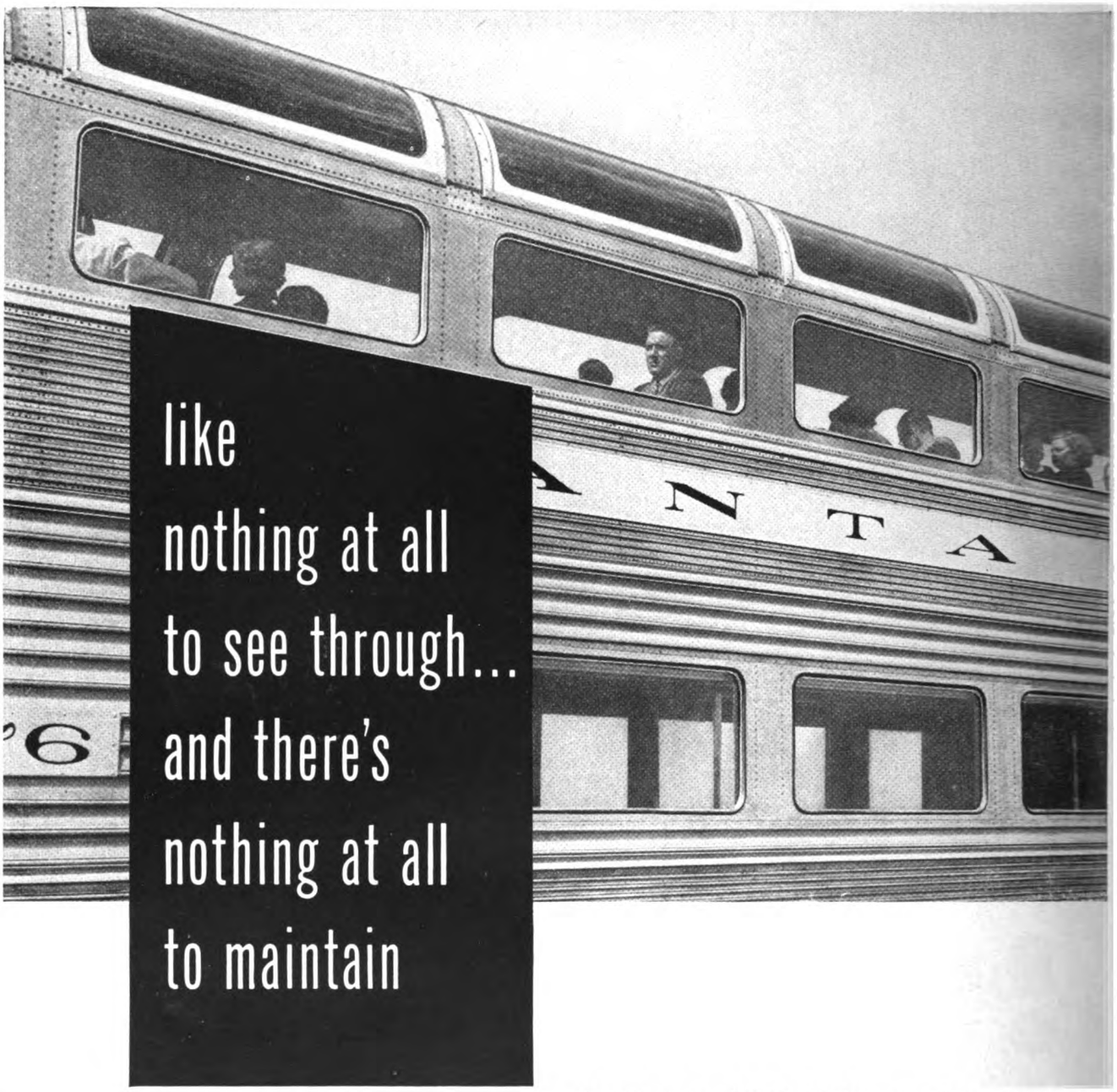
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES



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These windows stay clear because of the original Adlake "Breather" device—no dehydrants to change. Even if panes get broken you replace them on your own premises—no need to ship these windows to the factory.

Adlake

the original "Breather" Window

All major American railroads use Adlake "Breather" windows; some have been in uninterrupted service for 25 years. We'd like to give you all the details. THE ADAMS & WESTLAKE COMPANY, 1152 North Michigan, Elkhart, Indiana • New York • Chicago.

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TIME-SAVING IDEAS FOR **MARCH 1958**

Volume 132 • No. 3

MOTIVE POWER AND CAR

FL-9's Are Changing New Haven Operations 29
Electro-Motive has made a standard model of the diesel-electric units it built for the New Haven. These locomotives are eliminating the traditional locomotive change at New Haven, Conn.

Journal Lubricating Devices — 1958 32
Nineteen lubricating devices are approved by the AAR for application to solid-bearing freight-car assemblies now. Their designs vary greatly and are of importance to all car men.

B&M Super Service for RDC's 34
Over 700 ft long, the new Budd building at the B&M's Boston engine terminal is designed to speed the servicing and daily ICC inspections of the world's largest RDC fleet.

Pennsy Tests Its Lube Oil — Part II 36
Chemical and physical tests of crankcase oil from each Pennsy locomotive are as important as the spectroscopic inspection previously described. The entire program has cut PRR engine failures.

Timed for Trouble 38
Mechanical refrigerator car trouble shooting is presented in a popular and informal style. In this first installment Pete meets his first mechanical reefer and solves a problem.

SP Is in the Chips 39
Southern Pacific has just received a series of General American cars designed specifically for the movement of wood chips from saw mills to the paper plants on its lines.

Two-Cycle O-P Engine Is Supercharged 40
Fairbanks-Morse has announced the application of super-chargers to its standard two-cycle engines. This is the end of a long development program and promises more power and fuel economy.

ELECTRICAL

Advances Have Been Made in D-C Hi-Potting 46
The conditions of electrical insulation and the reasons for them can be predicted without raising the test voltage high enough to cause damage.

U.S. Steel Gets Substantial Savings Glass Banding Armatures 46A
Glass banding for motor and generator armatures is now used universally for repair of all types of motors overhauled in the South Works of the U.S. Steel Corporation.

Propane Replaces Gasoline 46B
The change-over from gasoline to propane as fuel for Lackawanna trucks has resulted in lower costs of operation and extended periods between overhauls.

When Florida East Coast Shops a Passenger Car . . . Electro-Pneumatic Brakes are Tested 50
FEC has built a compact brake testing panel which is used to test all the functions and wiring of the E-P brake system on its coaches.

How Should a Brush Grade Be Selected? 56
If a brush is to give maximum service, it must be selected for mechanical strength, proper friction level and ability to maintain good commutation in all service conditions.

From the Diesel Maintainer's Note Book 53
In which two men with the necessary know-how discuss one of the basic causes of motor flashovers.

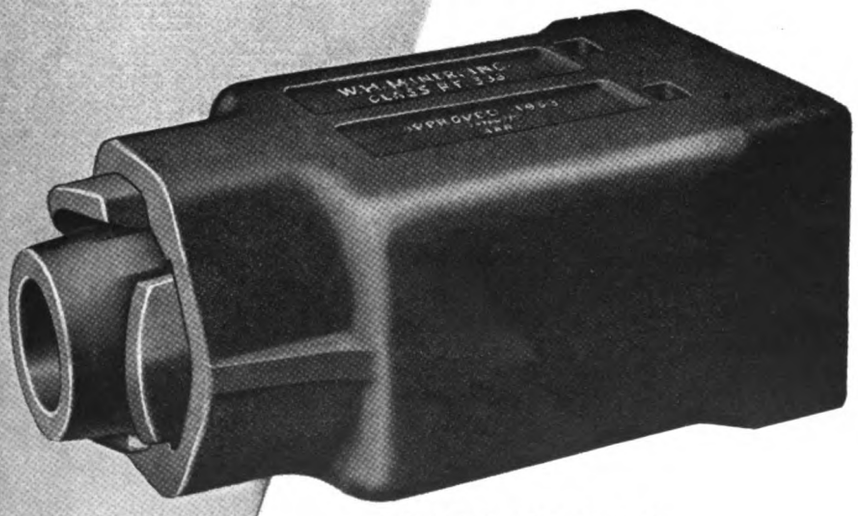
DEPARTMENTS

What's New in Equipment	7	Car Repair Time-Savers	43
Report	18	Supply Trade Notes	72
Personal Mention	22	Helps from Manufacturers	76

MINER 2

OUTSTANDING RECOMMENDATIONS FOR HIGH OPERATING EFFICIENCY

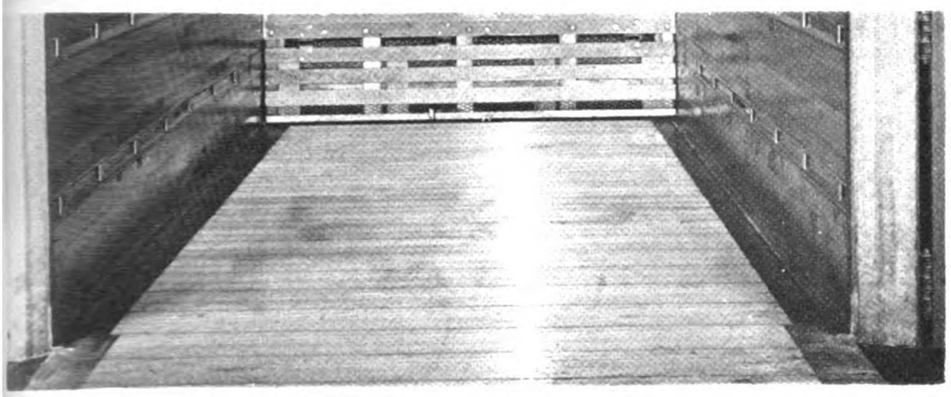
CLASS A-22-XL



CLASS RF-333

The Miner Class A-22-XL Friction Draft Gear and Miner Class RF-333 Rubbe Friction Draft Gear fulfill ev requirement for efficient performance in freight tra operation. Both draft gea retain their high capacity with low sill pressures dur many years of service. Th gears were certified unde the friction draft gear Specification No. M-901 a are approved for unlimite application to cars in interchange.

W. H. MINER, INC. CHICAGO



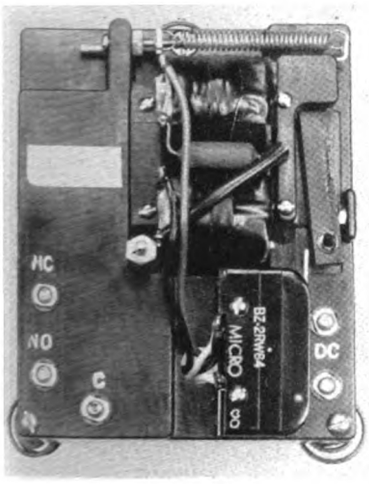
Aluminum Flooring

Two ice refrigerator cars with aluminum floors are being tested by Wilson Car Lines. The floors were designed by Reynolds Metals, Pacific Car & Foundry, and Wilson.

The floors are composed of 10-in. wide 6063 aluminum alloy extrusions. Each extends the width of car and is fastened by screws to the wooden floor stringers. The edges interlock to the adjoining shapes, making a moisture-proof joint. The floor is about ⅛ in. thick, and is reinforced by five integral parallel ribs running the length of the section. The surface has serrations 0.031 in. deep, providing a non-skid floor.

A border strip without serrations is used along the edges of the floor to facilitate drainage and cleaning. The bottom board on the car sides is replaced with interlocked sections of aluminum flashing. Tongue and grooving at top gives water-proof protection 5¼ in. above the floor.

Reynolds engineers say the floors can easily be installed in existing equipment. Based on applications to refrigerated transport trucks, they expect the aluminum car floor will last the lifetime of the car under normal operating conditions. Less maintenance is expected, along with less idle time for cleaning and drying of cars. The lightweight metal resists corrosion and does not absorb moisture or odors. *Reynolds Metals Company, Dept. RLC, 2000 S. Ninth st., Louisville 1, Ky.*



Automatic Battery Charging Control

The Edison automatic charge control assures accurate, automatic charging of nickel-iron-alkaline storage batteries. The control consists basically of a voltage sensitive, temperature compensated relay which operates when the voltage of the battery being charged rises to a value of 1.70 volts per cell at 77 deg F. Actuation of this relay starts an electric motor-driven time clock which continues the operation of the charging equipment, without altering the rate characteristics, for a set period of time. Because of the temperature compensating factor, the relay will function at a higher voltage when the ambient temperature is below 77 deg F, and at a lower voltage when the ambient rises above 77 deg F.

The automatic charge control can be used with any charging equipment that will charge an Edison battery at an average of normal rate with the final rate not less than 80 per cent of the normal rate of the battery being charged. The amount of charging is controlled automatically and the charge itself is terminated automatically when the time interval is completed.

The Edison control can be mounted in existing charger cabinets. An enclosure is available The timer normally provided with most charging equipment can be utilized with the automatic charge control. *Edison Storage Battery Division, Thomas A. Edison Industries, Dept RLC, West Orange, N J.*

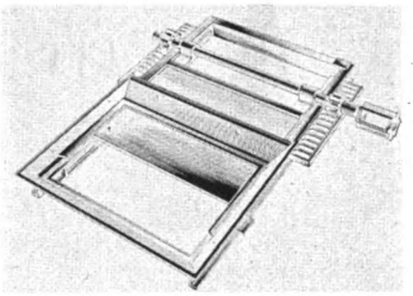
Power System Protection

The PRD-C5700 ground dectector and power system alarm control is a high resistance device which indicates the potential of each phase of the three-phase power system. These voltages are continually indicated by meters and pilot lights. At a preset differential in this voltage through relays and rectfiers, an alarm will sound when any fault occurs on the power system

This detector is designed for secondary voltages of 208, 220, 440, 550, 880 and 2,400, which can be either delta or star connected.

The device senses the power performance of three-phase systems. It will detect grounds, single-phasing, low voltage unbalanced loads, loose connections, low power factor, arcing and surging and faulty primary voltage.

The dectector is connected permenently to the line and momentary or continuous faults which cause differentials in voltage will give an alarm. The indication is usually caused by a potental difficulty and gives the operator a chance to correct the trouble before serious damage is done *Principle Research and Development Corporation, Dept. RLC, Aberdeen, South Dakota.*



Covered Hopper Car Outlet

Portloc, an all-welded steel plate covered hopper car outlet, is said to provide maximum strength with minimum weight, and features easy removal of door for thorough cleaning and repair work. In retracted position, it is only necessary to lift the integral door and pinion assembly from the supporting ways. The outlet can be modified to suit different types of cars, and provides more room between the frame and rail for increased flexibility in unloading operations. The cast steel rack and pinions, being in the open, are easy to clean.

The Portloc outlet comes completely assembled and ready for application—no additional parts are needed. *Keystone Railway Equipment Company, Dept. RLC, 80 East Jackson blvd., Chicago 4.*

Recessed Jack for Spot Repairs

This package jack arrangement has been developed to simplify spot system repairs on rip tracks. Cars spotted over the jacking equipment can be positioned at desired height (up to 60 in.) with the five-way control. The entire installation can be covered by a shed, with

(Continued on page 14)

A Cut Above Average

A. Taper Bridge Reamer (Straight Flute)

B. Taper Bridge Reamer (Spiral Flute)

C. Car Reamer (Straight Flute)

High grade small tools perfected through years of specialization.

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CHUCKING REAMERS
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PIN REAMERS
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RIVET SETS
SPECIAL REAMERS

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SMALL W TOOLS

WESTERN LOCOMOTIVE and CAR JACK
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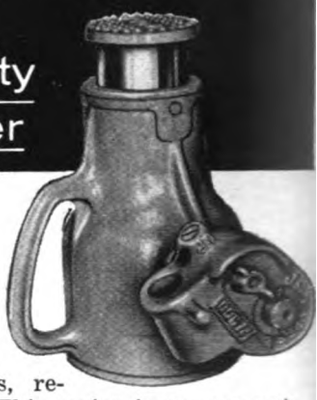
loads easier



WESTERN has made the first major change in Locomotive and Car Journal Jacks by adding TIMKEN tapered thrust roller bearings, replacing ball bearings. This major improvement means reduced friction, greater speed, easier operation and less maintenance . . . available in 25, 35 and 50 ton capacities. Aluminum or malleable steel housings available in 25 or 35 ton models.

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American Brake Shoe Company, Railroad Products Division 10, 11
American Steel Foundries 46, 47
Armco Steel Corporation 37

Beatty Machine & Mfg. Co. 66

Cincinnati Grinders, Inc. 24
Columbia Geneva Steel Division, United States Steel Corporation 71

Davis Brake Beam Company 40
Demp-Nock Co., The 74
Douglas Fir Plywood Association 50, 51

Electro-Motive Division, General Motors 64, 65
Esso Standard Oil Company 77
Ex-Cell-O Corporation 55
Exide Industrial Division—Electric Storage Battery Co., The 59

Gardner-Denver Company 62
General Steel Castings Company 19

Holland Company 20
Huck Manufacturing Company 75

Ideal Industries, Inc. 74
Institute of Thread Machiners, Inc. 69
International Nickel Company 43

Journal Box Servicing Corporation 4

Lewis Bolt & Nut Company 76
Lix Corporation, The 70

Magnus Chemical Co., Inc. 72
Magnus Metal Corporation 12, 13
Miller Lubricator Co. 75

National Carbon Company, Division of Union Carbide Corporation 15
National Electric Coil Company 3
National Malleable & Steel Castings Company ..... Inside Front Cover

Pullman-Standard Car Manufacturing Company 8, 9, 57

Standard Car Truck Company 67
Standard Oil of California 17
Standard Railway Equipment Manufacturing Company 22, 23
Stran-Steel Corporation, Unit of National Steel Corporation 73
Stratoflex, Inc. 68

Timken Roller Bearing Company, The ....Back Cover

Union Carbide Corporation, National Carbon Co. Div. 15
United States Graphite Company 7
United States Steel Export Company 71
United States Steel Corporation (NTD) 71

Waukesha Motor Company .....Inside Back Cover
Wayne Tool Company 78
Western Railroad Supply Co. 78
Westinghouse Air Brake Company 60, 61
Wine Railway Appliance Co., The 38, 39
Wyandotte Chemicals Corporation 52, 53

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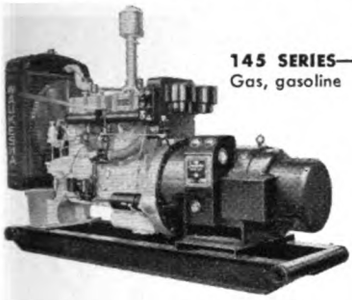
WAUKESHA

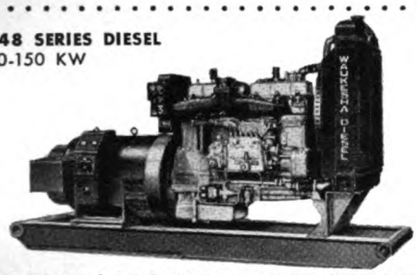


145 SERIES—45-110 KW
Gas, gasoline

Industrial ENGINATORS®

50-800 KW

NATURAL GAS • LPG • GASOLINE • DIESEL



148 SERIES DIESEL
50-150 KW

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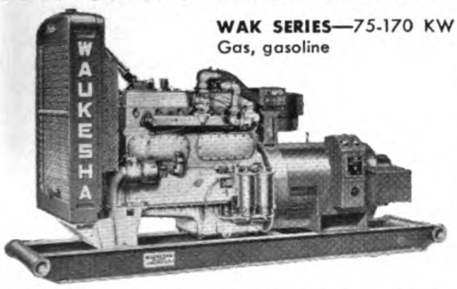
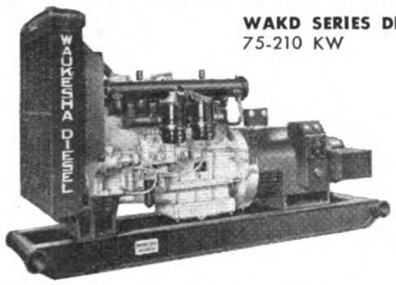
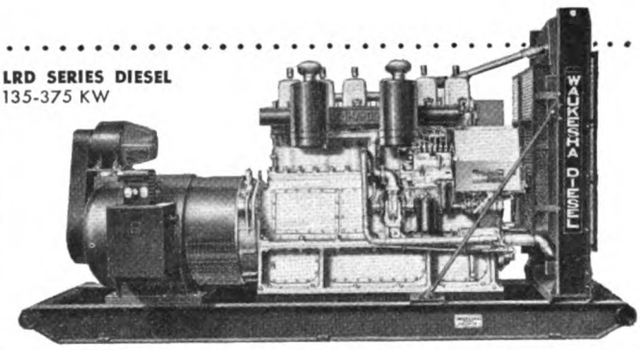


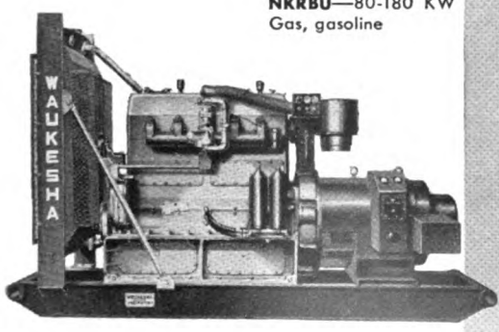
WAK SERIES—75-170 KW
Gas, gasoline



WAKD SERIES DIESEL
75-210 KW



LRD SERIES DIESEL
135-375 KW



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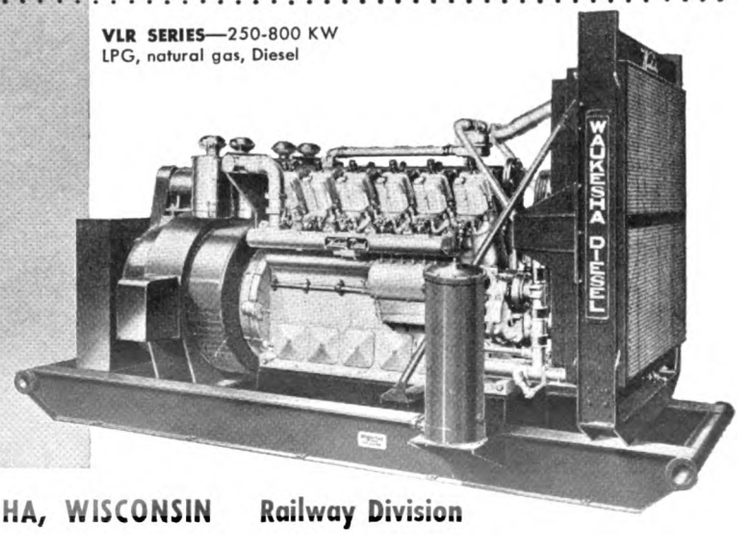

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335-R

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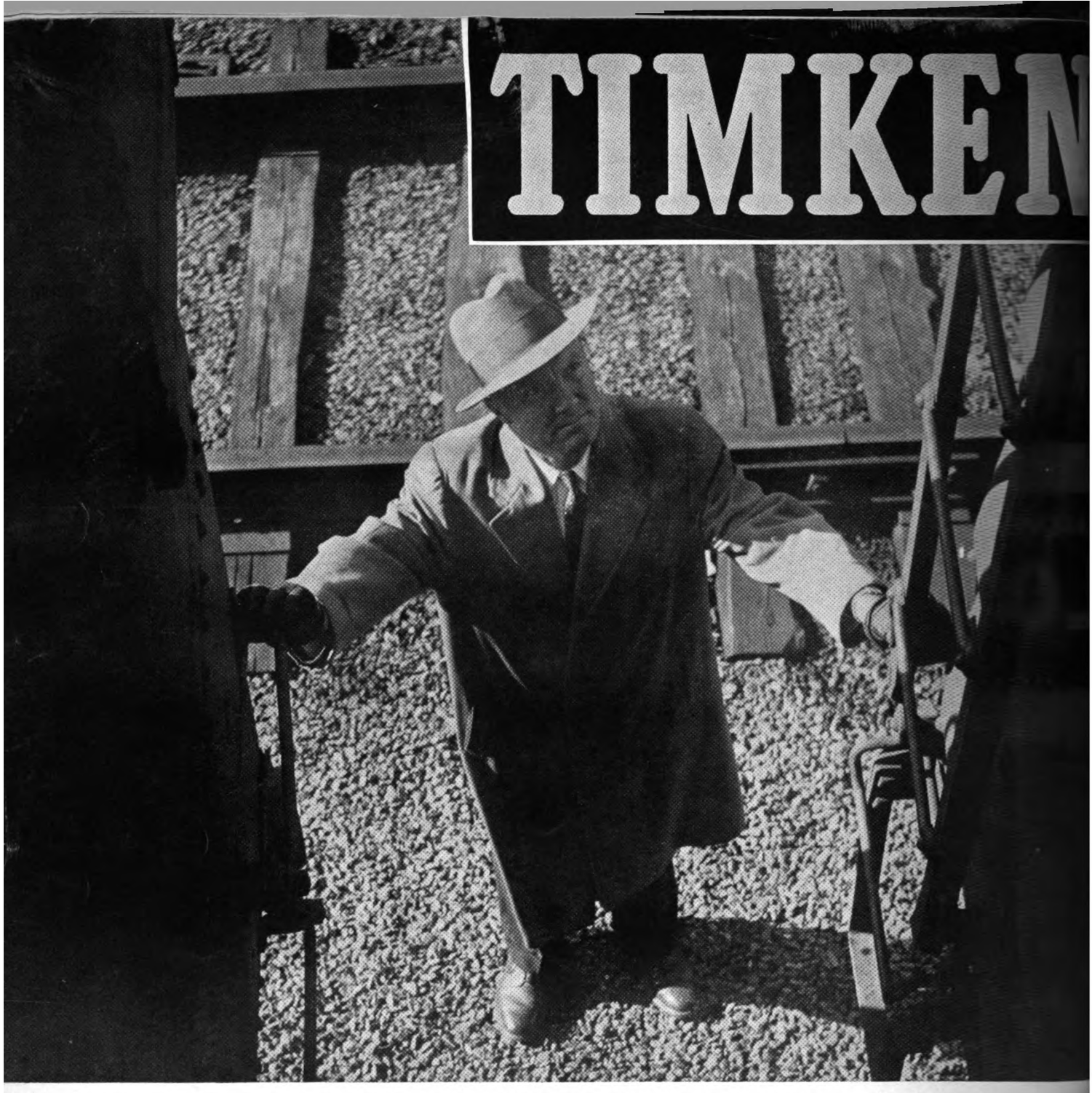

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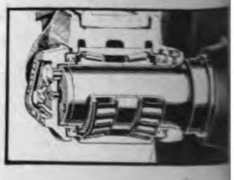
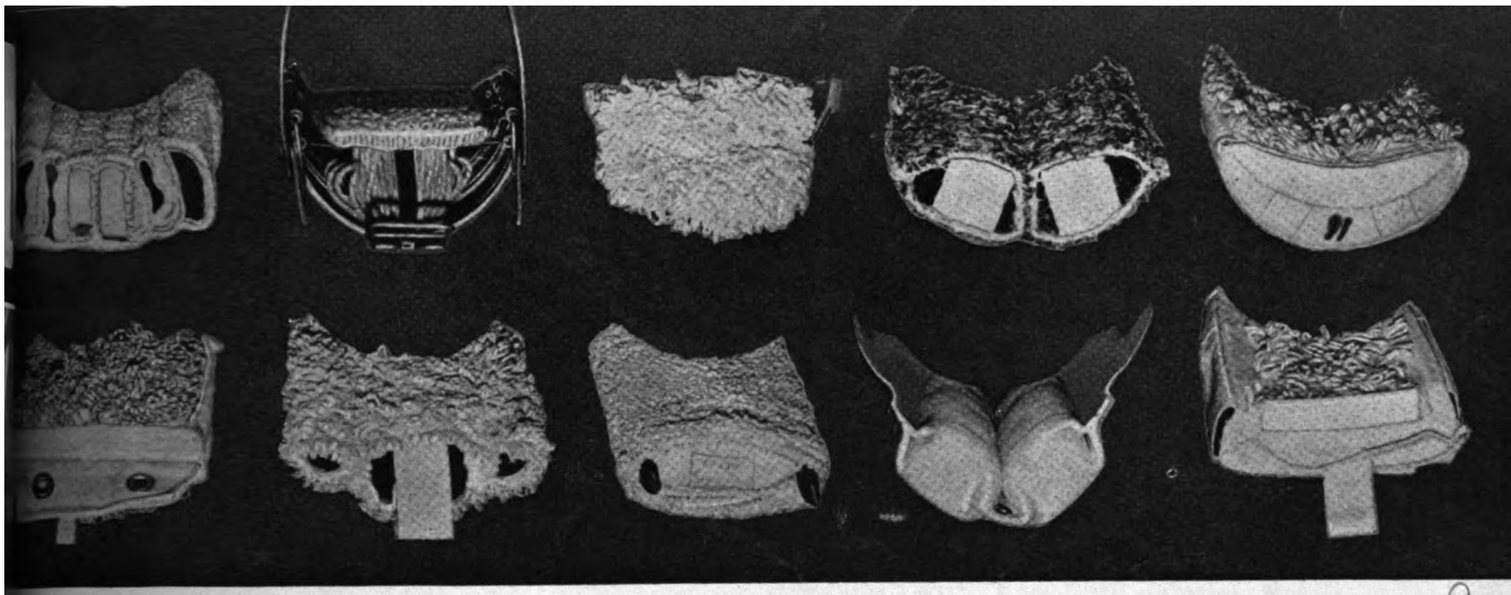
That's why "Roller Freight" is rolling in interchange. Our booklet, "How America's Railroads Can Save $224,000,000 A Year", will tell you more. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".





Lubricators: What Is the Situation Now? . . . Page 32

RAILWAY LOCOMOTIVES AND CARS

A SIMMONS-BOARDMAN **TIME-SAVER** PUBLICATION

MARCH 1958

Electro-Motive's Newest Locomotives . . . Page 29

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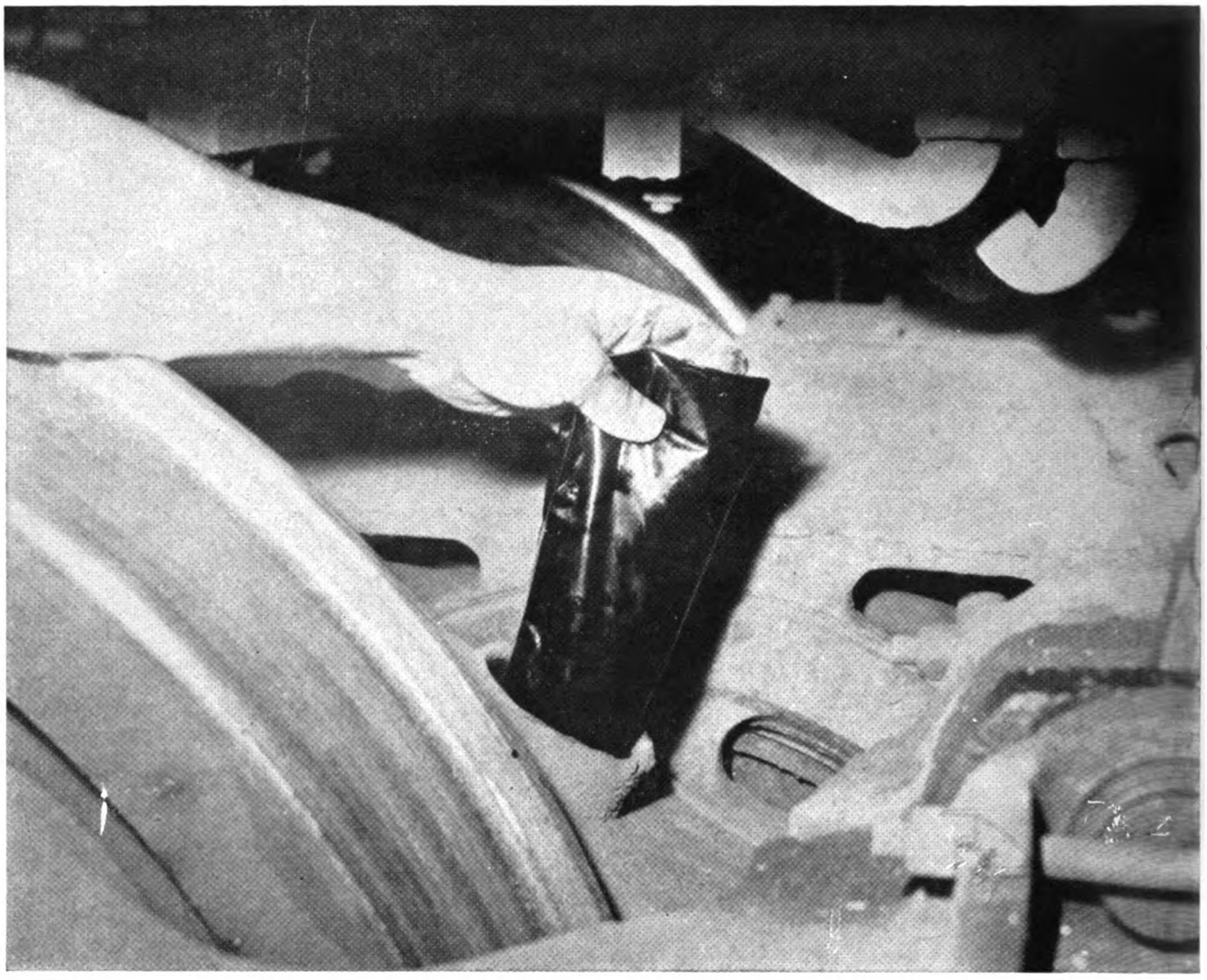

It's "in the bag" for easy application

...Texaco Crater

Texaco Crater is now available in 1-lb. polyethylene bags —48 bags to the case—clean, convenient, economical. This is the same reliable product that has long been giving traction motor gears outstanding protection in all types of Diesel gear cases. But now—make-up servicing is so fast and easy—just drop in bag and all.

Time and again, comparative road tests have proven that Texaco Crater gives more miles per pound. Now, with in-the-bag application, over-all lubricating costs can be lowered, too—because in over-the-pit servicing, it's easy to control quantity, eliminate all waste, sharply reduce application time.

For full information, call the nearest Texaco Railway Sales Office in New York, Chicago, San Francisco, St. Paul, St. Louis, or Atlanta. Or write:

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The Texas Company, *Railway Sales Division,* 135 East 42nd Street, New York 17, N.Y.

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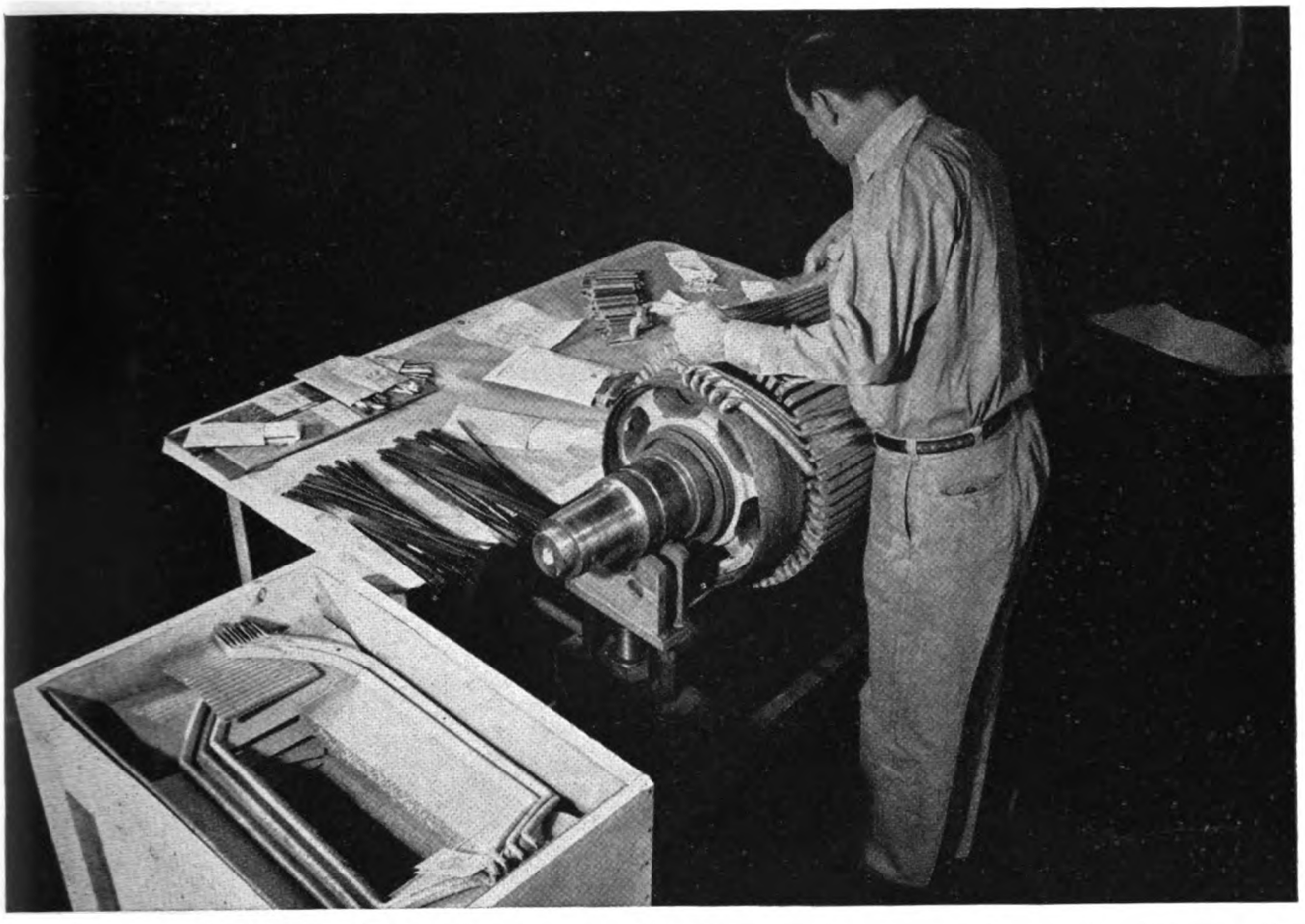
TEXACO Railroad Lubricants

AND SYSTEMATIC ENGINEERING SERVICE

IN ALL 48 STATES



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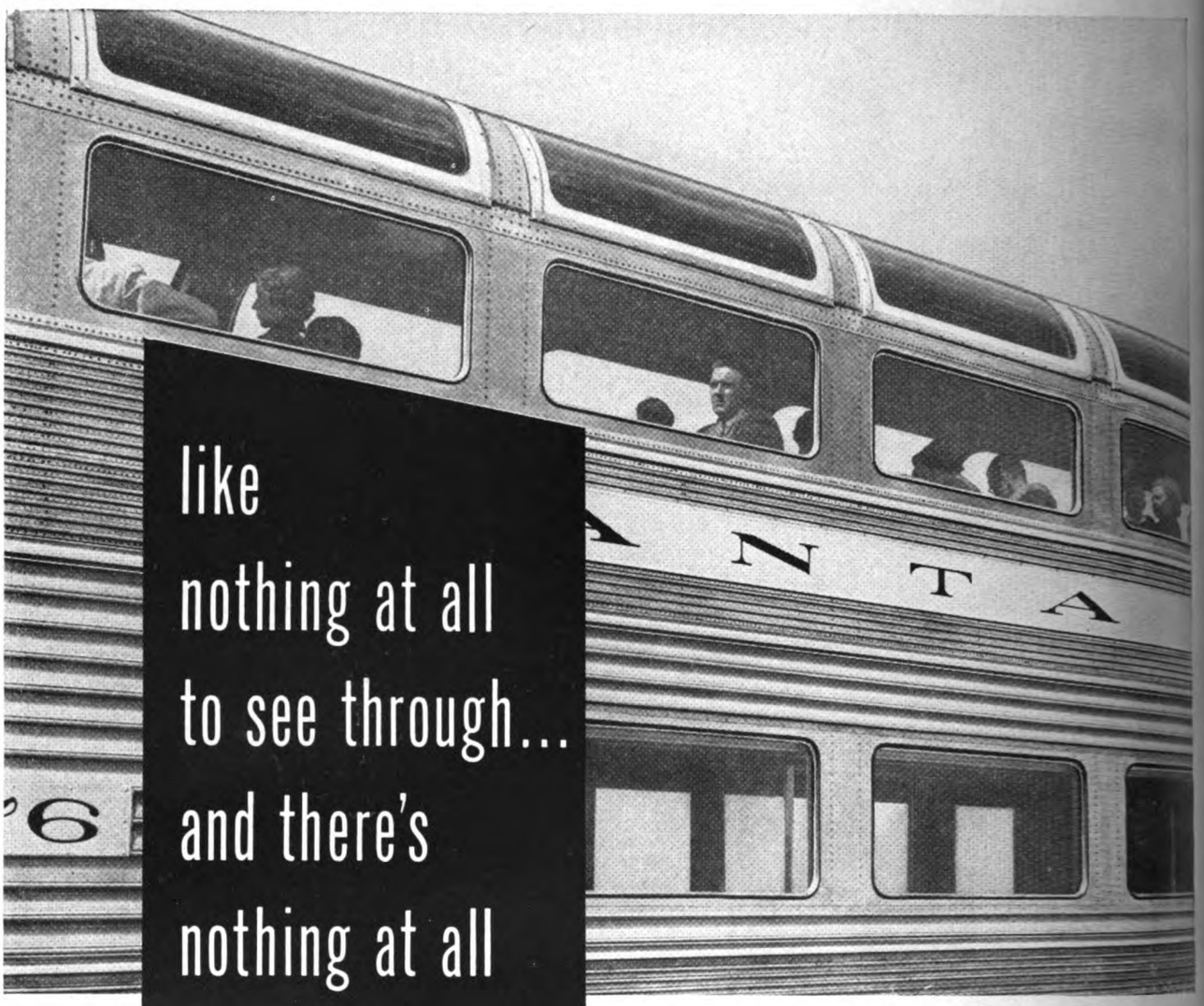
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES



That's true—Adlake double-pane "Breather" windows stay crystal-clear regardless of temperature, altitude or humidity changes with *absolutely no maintenance whatever* except routine washing of the outer surfaces.

These windows stay clear because of the original Adlake "Breather" device—no dehydrants to change. Even if panes get broken you replace them on your own premises—no need to ship these windows to the factory.

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the original "Breather" Window

All major American railroads use Adlake "Breather" windows; some have been in uninterrupted service for 25 years. We'd like to give you all the details. THE ADAMS & WESTLAKE COMPANY, 1152 North Michigan, Elkhart, Indiana • New York • Chicago.

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TIME-SAVING IDEAS FOR **MARCH 1958**

Volume 132 • No. 3

MOTIVE POWER AND CAR

FL-9's Are Changing New Haven Operations 29
Electro-Motive has made a standard model of the diesel-electric units it built for the New Haven. These locomotives are eliminating the traditional locomotive change at New Haven, Conn.

Journal Lubricating Devices — 1958 32
Nineteen lubricating devices are approved by the AAR for application to solid-bearing freight-car assemblies now. Their designs vary greatly and are of importance to all car men.

B&M Super Service for RDC's 34
Over 700 ft long, the new Budd building at the B&M's Boston engine terminal is designed to speed the servicing and daily ICC inspections of the world's largest RDC fleet.

Pennsy Tests Its Lube Oil — Part II 36
Chemical and physical tests of crankcase oil from each Pennsy locomotive are as important as the spectroscopic inspection previously described. The entire program has cut PRR engine failures.

Timed for Trouble 38
Mechanical refrigerator car trouble shooting is presented in a popular and informal style. In this first installment Pete meets his first mechanical reefer and solves a problem.

SP Is in the Chips 39
Southern Pacific has just received a series of General American cars designed specifically for the movement of wood chips from saw mills to the paper plants on its lines.

Two-Cycle O-P Engine Is Supercharged 40
Fairbanks-Morse has announced the application of super-chargers to its standard two-cycle engines. This is the end of a long development program and promises more power and fuel economy.

ELECTRICAL

Advances Have Been Made in D-C Hi-Potting 46
The conditions of electrical insulation and the reasons for them can be predicted without raising the test voltage high enough to cause damage.

U.S. Steel Gets Substantial Savings Glass Banding Armatures 46A
Glass banding for motor and generator armatures is now used universally for repair of all types of motors overhauled in the South Works of the U.S. Steel Corporation.

Propane Replaces Gasoline 46B
The change-over from gasoline to propane as fuel for Lackawanna trucks has resulted in lower costs of operation and extended periods between overhauls.

When Florida East Coast Shops a Passenger Car . . . Electro-Pneumatic Brakes are Tested 50
FEC has built a compact brake testing panel which is used to test all the functions and wiring of the E-P brake system on its coaches.

How Should a Brush Grade Be Selected? 56
If a brush is to give maximum service, it must be selected for mechanical strength, proper friction level and ability to maintain good commutation in all service conditions.

From the Diesel Maintainer's Note Book 53
In which two men with the necessary know-how discuss one of the basic causes of motor flashovers.

DEPARTMENTS

What's New in Equipment 7
Report 18
Personal Mention 22
Car Repair Time-Savers 43
Supply Trade Notes 72
Helps from Manufacturers 76

MINER

OUTSTANDING RECOMMENDATIONS FOR HIGH OPERATING EFFICIENCY

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The Miner Class A-22-XL Friction Draft Gear and Miner Class RF-333 Rubbe Friction Draft Gear fulfill ev requirement for efficient performance in freight tra operation. Both draft gea retain their high capacity with low sill pressures dur many years of service. Th gears were certified unde the friction draft gear Specification No. M-901 a are approved for unlimite application to cars in interchange.

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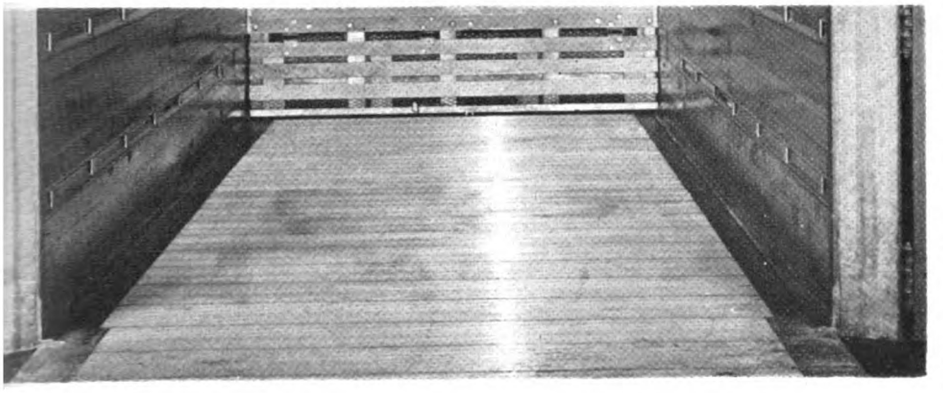


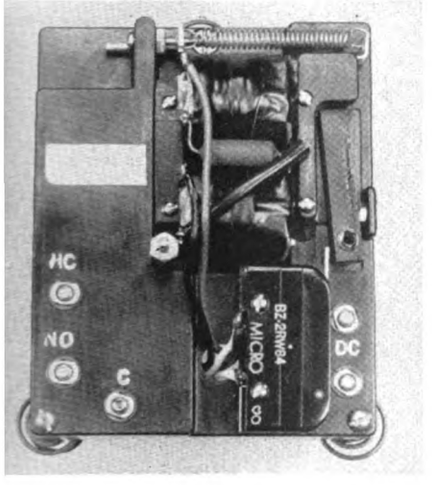
luminum Flooring

vo ice refrigerator cars with aluminum ors are being tested by Wilson Car Lines. ıe floors were designed by Reynolds Metals, cific Car & Foundry, and Wilson.

The floors are composed of 10-in. wide 63 aluminum alloy extrusions. Each extends : width of car and is fastened by screws to : wooden floor stringers. The edges interlock the adjoining shapes, making a moisture- ɔof joint. The floor is about ⅛ in. thick, d is reinforced by five integral parallel ribs ıning the length of the section. The surface s serrations 0.031 in. deep, providing a n-skid floor.

A border strip without serrations is used along the edges of the floor to facilitate drainage and cleaning. The bottom board on the car sides is replaced with interlocked sections of aluminum flashing. Tongue and grooving at top gives water-proof protection 5¼ in. above the floor.

Reynolds engineers say the floors can easily be installed in existing equipment. Based on applications to refrigerated transport trucks, they expect the aluminum car floor will last the lifetime of the car under normal operating conditions. Less maintenance is expected, along with less idle time for cleaning and drying of cars. The lightweight metal resists corrosion and does not absorb moisture or odors. *Reynolds Metals Company, Dept. RLC, 2000 S. Ninth st., Louisville 1, Ky.*



ıtomatic Battery ıarging Control

: Edison automatic charge control as- :s accurate, automatic charging of nickel- ı-alkaline storage batteries. The control sists basically of a voltage sensitive, tem- ıature compensated relay which operates :n the voltage of the battery being charged s to a value of 1.70 volts per cell at 77 F. Actuation of this relay starts an tric motor-driven time clock which con- ıes the operation of the charging equipment, without altering the rate characteristics, for a set period of time. Because of the temperature compensating factor, the relay will function at a higher voltage when the ambient temperature is below 77 deg F, and at a lower voltage when the ambient rises above 77 deg F.

The automatic charge control can be used with any charging equipment that will charge an Edison battery at an average of normal rate with the final rate not less than 80 per cent of the normal rate of the battery being charged. The amount of charging is controlled automatically and the charge itself is terminated automatically when the time interval is completed.

The Edison control can be mounted in existing charger cabinets. An enclosure is available The timer normally provided with most charging equipment can be utilized with the automatic charge control. *Edison Storage Battery Division, Thomas A. Edison Industries, Dept RLC, West Orange, N J.*

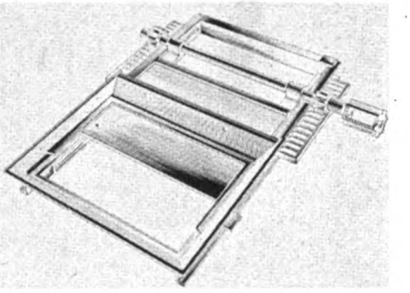
Power System Protection

The PRD-C5700 ground dectector and power system alarm control is a high resistance device which indicates the potential of each phase of the three-phase power system. These voltages are continually indicated by meters and pilot lights. At a preset differential in this voltage through relays and rectfiers, an alarm will sound when any fault occurs on the power system

This detector is designed for secondary voltages of 208, 220, 440, 550, 880 and 2,400, which can be either delta or star connected.

The device senses the power performance of three-phase systems. It will detect grounds, single-phasing, low voltage unbalanced loads, loose connections, low power factor, arcing and surging and faulty primary voltage.

The dectector is connected permenently to the line and momentary or continuous faults which cause differentials in voltage will give an alarm. The indication is usually caused by a potental difficulty and gives the operator a chance to correct the trouble before serious damage is done *Principle Research and Development Corporation, Dept. RLC, Aberdeen, South Dakota.*



Covered Hopper Car Outlet

Portloc, an all-welded steel plate covered hopper car outlet, is said to provide maximum strength with minimum weight, and features easy removal of door for thorough cleaning and repair work. In retracted position, it is only necessary to lift the integral door and pinion assembly from the supporting ways. The outlet can be modified to suit different types of cars, and provides more room between the frame and rail for increased flexibility in unloading operations. The cast steel rack and pinions, being in the open, are easy to clean.

The Portloc outlet comes completely assembled and ready for application—no additional parts are needed. *Keystone Railway Equipment Company, Dept. RLC, 80 East Jackson blvd., Chicago 4.*

Recessed Jack for Spot Repairs

This package jack arrangement has been developed to simplify spot system repairs on rip tracks. Cars spotted over the jacking equipment can be positioned at desired height (up to 60 in.) with the five-way control. The entire installation can be covered by a shed, with

(Continued on page 14)

New Reading Gondolas Roll Into Service

Here are some of the 400 welded gondolas recently built for the Reading by Bethlehem's Johnstown, Pa., shops. These low-slung 70-ton cars will weather many years of heavy-duty service; they combine unusual ruggedness with the most advanced features of design.

As the photograph shows, the fixed-end bodies are heavily ribbed for extra strength and resistance to shock. Body plates up to and including 3/8 in. are of copper-bearing steel. Running gear consists of AAR one-wear wrought-steel wheels and AAR forged-steel axles with 6 x 11 journals.

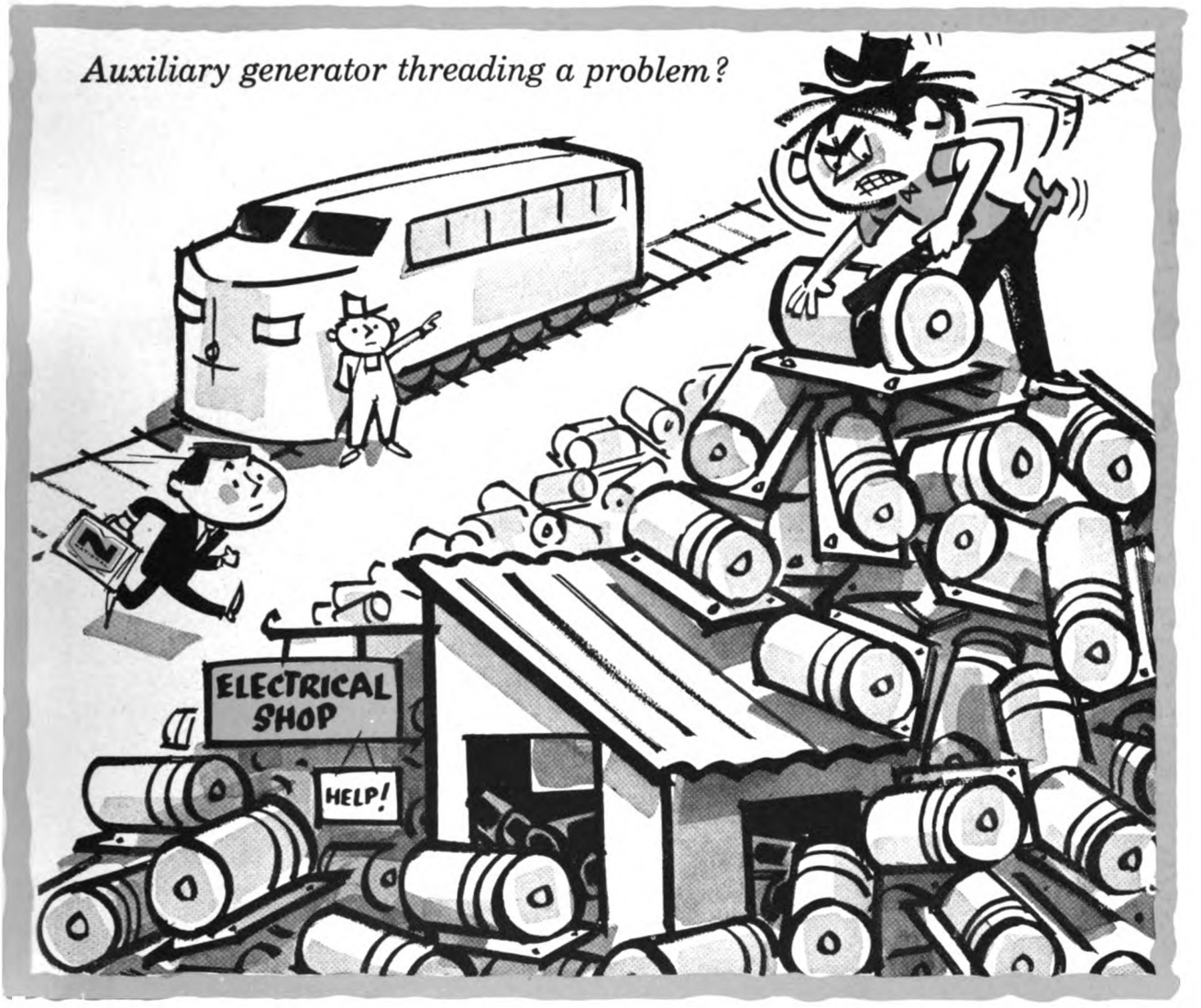
Length over strikers is 54 ft 9 in.; length inside, 52 ft 6 in.; width inside, 9 ft 6 in. From rail to top of side, the height is 7 ft 5/16 in.; from rail to floor, 3 ft 6 5/16 in. Truck centers are 43 ft 9 in. Capacity, level-full, is 1,745 cu ft.

When your own requirements call for gondolas, hopper cars, or other types, we suggest you check with our engineering division. We are equipped to plan the work from scratch, or to specifications that you supply. Once the design is approved, you can rely on the Bethlehem shops for an excellent production job, and for quick delivery.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



Your NATIONAL brush man stopped costly auxiliary generator repairs!

JOHN GIBB

Extreme threading on auxiliary generators caused excessive commutator maintenance on this mid-western railroad. The brushes the road had been using could not handle widely fluctuating loads, says "National" Carbon Brush Man, John Gibb.

John recommended that a "National" brush be tested. Once the first results were in, John's fellow "National" Carbon Brush Men followed through with similar tests on roads all over the country. Tests showed greatly improved performance and lower maintenance costs.

This is typical of the service National Carbon makes available to the nation's railroads. There are twenty-seven "National" Carbon Brush Men in the field ready to assist with any brush problems you might encounter.

Call on your "National" Brush Man today. Or write: National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

The terms "National", "N" and Shield Device, and "Union Carbide" are registered trade-marks of Union Carbide Corporation

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Why Redipak® Twin pads with Firestone* FOAMEX®

provide superior lubrication

Superior lubrication that will effectively control hot boxes is assured with Redipak® Twin lubricating pads, because of their unique design and the excellent lubricating properties of their woven cotton covers and Firestone Foamex cores.

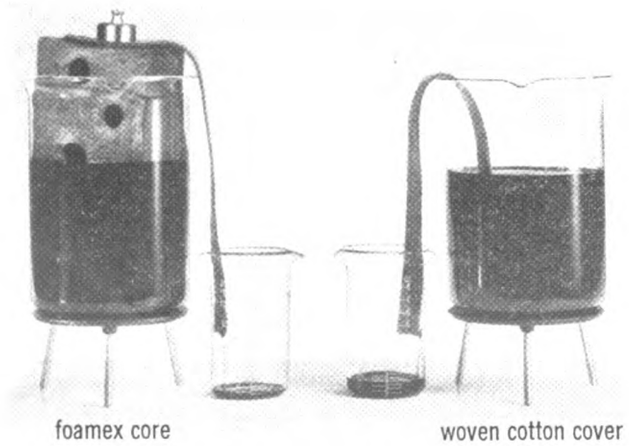
Take the Foamex core . . . more than just a mechanical filler, this material, which is produced by Firestone to our physical specifications, actually wicks oil when saturated, holds over five times its own weight in oil, and keeps its shape and resiliency under extremes of temperature.

The wicking ability of cotton hardly needs explaining. When woven into a seamless cover for Redipak Twin pads, the result is a highly efficient wicking material that will not lint or glaze. Add to these properties a unique design that provides superior oil distribution and positive shift prevention, and you have Redipak Twin lubricating pads.

**A special formulation of Foamex is used for Redipak Twin pads*

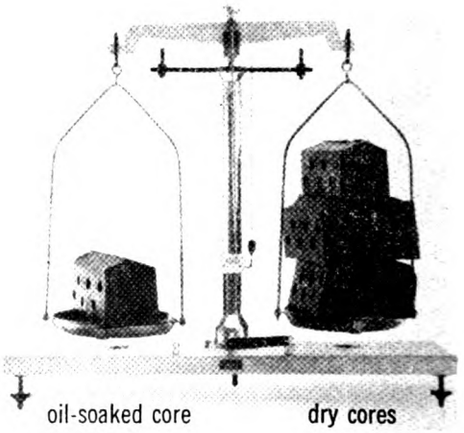
Redipak Twins keep their shape

The Foamex cores in Redipak Twin lubricating pads are produced to our physical specifications to resist taking a set under extremes of temperature. In this demonstration, adapted from actual production tests, one of two identically-sized samples has been compressed to 80% of its original height and immersed in oil at 250°F for 18 hours. At the end of that time, there was no difference in height between the tested sample on the left and the untested sample on the right. Despite compression under heat, the Foamex core held its shape!



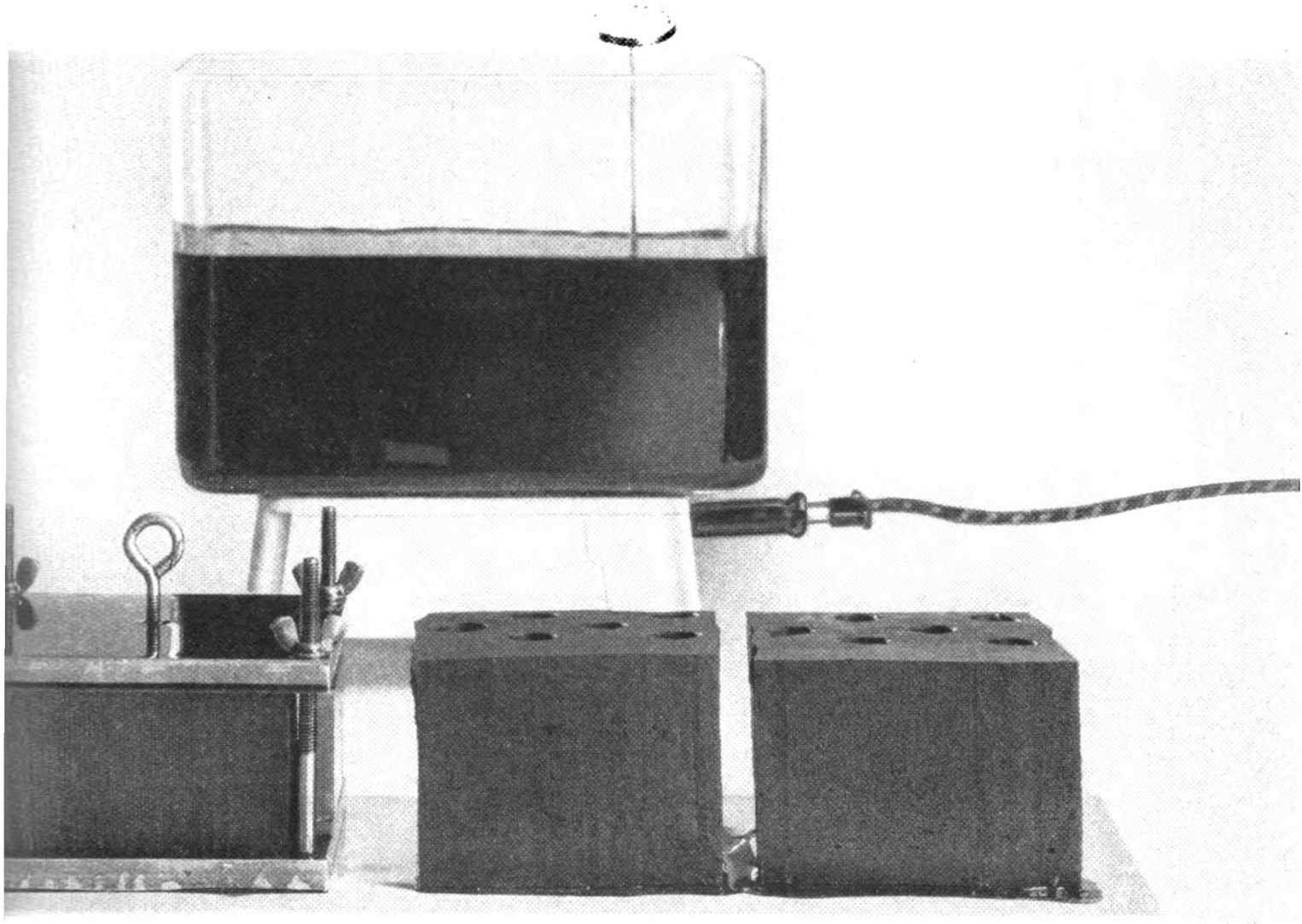
foamex core — woven cotton cover

Both core and cover wick oil! Both the cotton cover and the Foamex core in Redipak Twin lubricating pads move a steady flow of oil to the journal. The woven cotton cover, unmatched in wicking ability, is lint-free. The Foamex core not only provides the proper resilience, but it too wicks oil when saturated . . . all adding up to doubly effective lubrication!



oil-soaked core — dry cores

Redipak's Foamex core holds over 5 times its weight in oil! Redipak Twin lubricating pads hold an amazing amount of oil. Why? Mainly because of the Foamex core with its millions of interconnected cells. One sample of oil-soaked Foamex weighs as much as five and one-half dry samples of the same size . . . in other words five times its own weight in oil! Thus, the Redipak Twin core provides a generous oil reservoir—even when there is accidental loss of free oil.



npressed core

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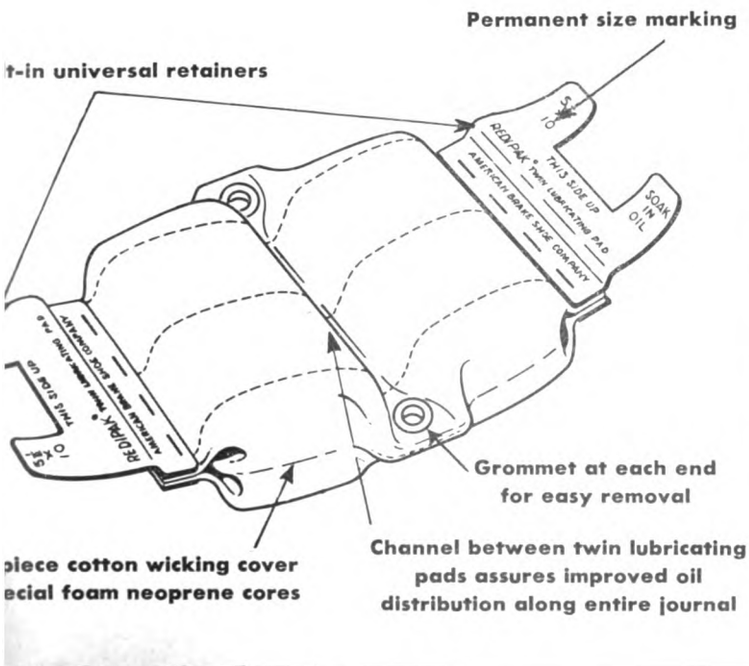
18 hours



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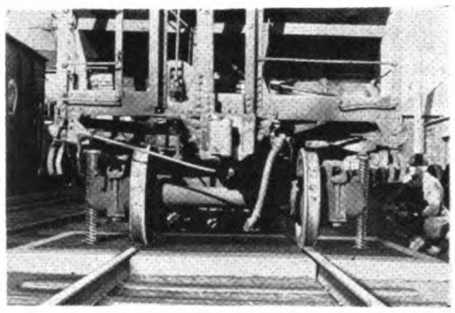
In Canada: Canadian Bronze Co., Limited



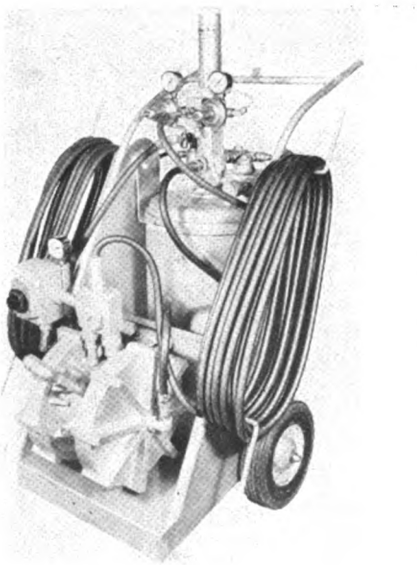
(*Continued from page 7*)

controls about 10 ft from the jacking unit.

The unit consists of two Joyce SG 2035-60 spur-gear screw jacks coupled to a two-speed 25-hp electric motor with double shaft extension. Each jack has two limit switches that automatically shut off the motor at upper and lower limits of the rise. Screws have a non-overhauling thread that makes it impossible to lower loads without power.

Five pushbutton stations are marked *up-fast, up-slow, stop, down-slow,* and *down-fast.* Fast speed is 48 in. per min; slow is 24 in. per min.

Jack screw housings are set in 6-ft concrete footings, while the motor and shaft are recessed a foot below the unit's center. The portion of the unit above ground can be flush with either top or base of the rail. *Joyce-Cridland Company, Dept. RLC, 2027 E. First st., Dayton 3, Ohio.*



Package Spray Painting Unit

The completely self-contained Chieftain series combines the Spee-Flo hot spray heater and reciprocating pump in a portable unit which carries the original 5- or 10-gal paint container. It is especially designed for industrial and maintenance painting requirements where long hose lines and portability are required. The mobile Chieftain provides hot-spray temperatures for one or two guns and on hose lines up to 75 ft in length.

Equipped with the U.L. approved Spee-Flo hot-spray heater and divorced action pump, circulation from heater to gun is maintained for temperature control. The operator can select paint temperature by simply turning the Dial-a-Matic controller. A single air and electrical connection places this complete spraying system in operation.

The 600 and 900 series models are equipped with a 2-kw or a 3-kw heater and a pump designed to spray up to a gallon a minute. A larger series Chieftain offers a similar assembly on a four-wheel cart and carries a 55-gal paint drum. *Spee-Flo Company, Dept. RLC, 720 Polk, Houston, Tex.*

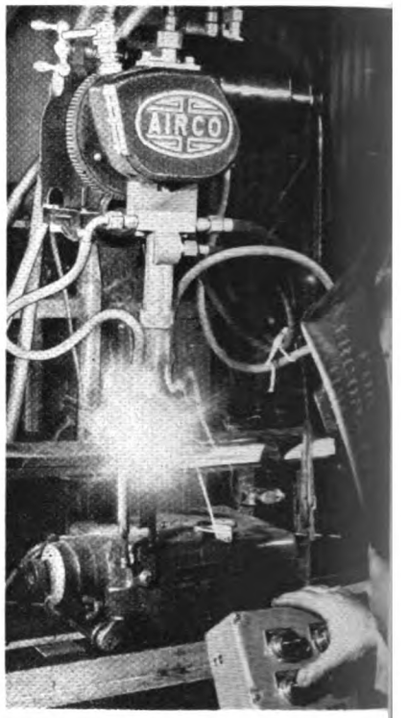
Megger Low-Resistance Ohmmeter

In electrical maintenance, this Megger low-resistance ohmmeter has numerous applications, including resistance measurements of electrical conductors, joints, contacts and windings of the low resistance type in oil circuit breaker assembles, rotating electrcal equipment, transformers, and coils. It can be flush, bench mounted because the scale, switch and terminals are on the top. The supply cord plugs into the end of the instrument and into any 115-volt a-c outlet. In addition to the rectifier model which may be plugged into any ordinary lighting circuit outlet, there is one having a battery power supply.

The instruments are provided with a quick acting automatic circuit breaker in the current circuit. It measures accurately down to 10 microhms, has four ranges, and weights 10 lb. A sturdy carrying case keeps instruments, leads and prods in one place *James G. Biddle Co, Dept RLC, 1316 Arch Steet, Philadelphia 7, Pa*

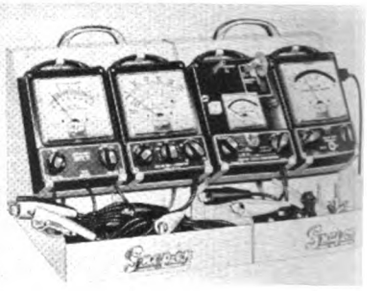
Heavy-Duty Welding Head

Specifically designed for the heavier, production applications of automatic machine welding, the Model AMH-C Aircomatic machine head has the capacity for handling heavy welding wires. Aluminum wires of from 3/64 to 1/8 in. and hard wires from .045 to 1/8 in. can be fed at any rate up to 600 in. per min.



Wire feed speed is fully adjustable.

The AMH-C machine barrel is rated at 60 amp on a 100 per cent duty cycle. The welding head can be rotated through 360 deg. *Air Reduction Sales Company, a division of Air Reduction Company, Dept. RLC, 150 East 42nd st., New York 17.*



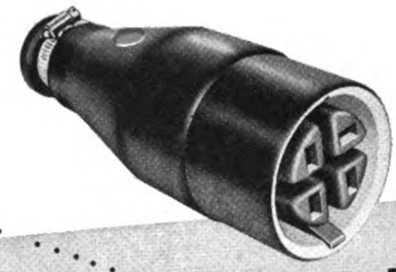
Engine and Electrical System Testing Set

A new set of engine and electrical system testers for maintenance of automotive and similar engines is designed for accuracy, portabilit, and ease of use. Each tester has a minimum number ofadjustments and simple connections. No outside power is required.

The set consists of a generator-regulator tester, Tach-Dwell meter, ignition analyzer, exhaust gas analyzer, two tune-up meter racks, and a roll stand. Each meter rack holds two testers firmly in position, yet permits immediate removal of meters when desired. The base of the meter racks have compartments for storage of leads and adapters. *Snap-On Tools Corporation, Dept. RCL, 28th ave., Kenosha, Wis.*

(*Turn to page 62*)

LOOK FOR THIS
. . . MARK OF QUALITY!



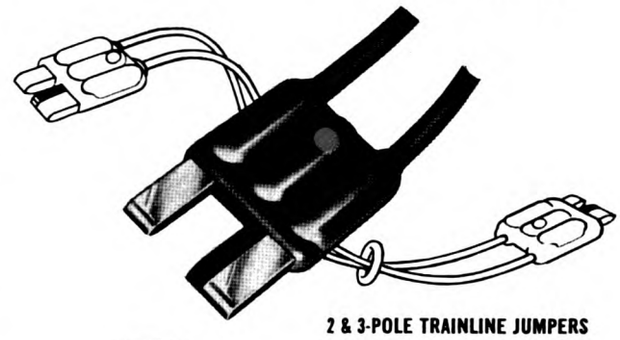
A. C. STANDBY PLUGS
Attachable or *Molded-to-Cable* designs with replaceable contacts. Attachable plug illus.

JOY CONNECTORS for CAR EQUIPMENT!

BATTERY CHARGING PLUGS
Attachable or *Molded-to-Cable* designs with replaceable contacts. Attachable plug illus.

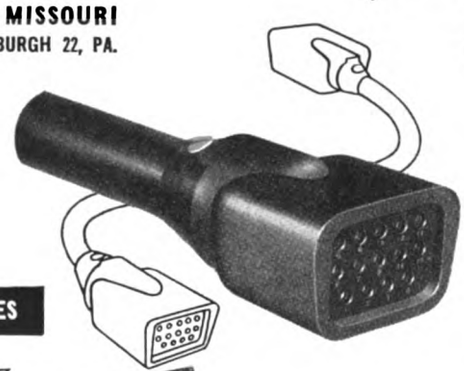
If ease of installation, safety and dependable performance are important considerations in your selection of electrical connectors . . . JOY plugs and receptacles rate "top billing" on your "preference list." Factory molded as trim, rubber insulated/Neoprene jacketed units that are **absolutely safe to handle even in dripping wet installations . . . they're shatterproof, distortion-resistant and practically immune to damage by oils, grease and car washing solutions.**

Complete details on JOY connectors for Car equipment as well as many other railway needs may be found in Bulletin #B64. If you haven't received your copy, or need extra copies . . . please fill out and mail the coupon below to:



2 & 3-POLE TRAINLINE JUMPERS
Neoprene/rubber insulated. 2-pole unit illus.

JOY MANUFACTURING COMPANY
ELECTRICAL PRODUCTS DIVISION
1201 MACKLIND AVENUE, ST. LOUIS 10, MISSOURI
EXECUTIVE OFFICES — HENRY W. OLIVER BLDG., PITTSBURGH 22, PA.



14-POLE R. R. JUMPERS
For car communication and entertainment circuits.

MATING RECEPTACLES
available for above plugs!

Get the facts on these Products in B64

PRODUCT/APPLICATIONS	PAGES
STAND-BY SERVICE	4-7
CAR EQUIPMENT	**8-15**
DIESEL EQUIPMENT	16-21
(Including Traction Motor Sleeves)	
ROTARY SAND DRYERS	22-23
PORTABLE LIGHTING (SAL)	24-28
SPECIAL APPLICATIONS	29-36

Send me_____copies of JOY'S
Railroad Catalog # **B64**

☐ Have your Representative call.

NAME _____

TITLE _____

RAILROAD _____

_____

CITY _____ ZONE _____ STATE _____

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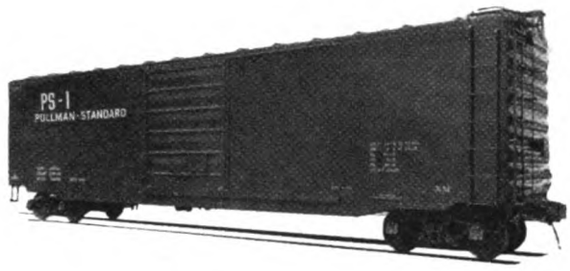
WORLD-WIDE DISTRIBUTION



EASE OF

another cost-saving

Making rolling stock maintenance and repair an easier, more economical job is another performance benefit designed and built into every Pullman-Standard Standardized Freight Car.

The PS-1 Box Car typifies this maintenance simplicity. The design of all its major components and even the arrangement of minor parts are planned with reduced maintenance and ease-of-maintenance as major considerations.

Rip-track or major repair programs of PS-1 Box Cars are greatly simplified by the maintenance considerations designed into the PS-1; and, because the car is standardized, replacement parts which are exact duplicates of those damaged are readily available and easily installed. PS-1 Box Cars are speedily returned to revenue-producing service and repair costs reduced.

Write to Pullman-Standard today. Ask for copies of the booklets on each of the P-S Standardized line: PS-1 Box Car, PS-2 Covered Hopper, PS-3 Open Hopper, PS-4 Flat Car and PS-5 Gondola. See how many other built-in benefits—dependability, versatility, first cost economy—standardization can offer your railroad.

The PS-1 Needs Less Maintenance

The PS-1 is designed, engineered and produced to take the fullest advantage of each component—not only providing strength to absorb the hard service received in interchange but to resist unusual abuse plus the ravages of weather and corrosion. Potential corrosion pockets are eliminated through all-welded construction and careful attention to design details. Components work together to provide balanced strength without unnecessary weight.

Standard Parts—Easy Maintenance

Because the basic PS-1 Box Car is a standardized unit, like components of each car are precision fabricated with the same dies, jigs or fixtures. Thus, standard replacement parts are readily available.

Whether it's a torn side sheet or an entire side that requires replacement, PS-1 welded design makes the job easier. The replacement part or component will fit exactly, requiring a minimum of fitting-up or reworking.

Major Repair is Simplified

Heavy car rebuilding and repair programs are made much simpler and more economical thanks to standardized P-S Roofs, Ends, Sides, Underframes, other components are readily available. Even portions of underframes, for example the bolster, striker, center filler, the center sill section from bolster to striker, are available as a repair unit. Such standardized components can be installed with minimum time, labor, normal shop facilities.

THE WORLD'S LARGEST BUILDER OF ROLLING STOCK

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

221 NORTH LA SALLE STREET, CHICAGO 1, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO

MAINTENANCE

nefit of P-S Standardized Freight Cars

PS-1 BOX CARS
provide these cost-saving maintenance benefits

- Amply strong, corrosion-resistant copper-bearing galvanized steel roofs with unique corrugations to resist wracking, drumming and buckling.
- Automatically arc-welded O.H.S. copper-bearing steel sides—strong, durable and uniform.
- Corrugated die-formed ends with heavy 5/16" thick bottom panels and integral end sills—designed for maximum strength and resistance to corrosion.
- Precision made, all-welded underframe of great strength and durability. Service records prove its superiority of design and construction.

LOCOMOTIVES AND CARS REPORT FOR MARCH

Orders and Inquiries for New Equipment

Placed Since the Closing of the February Issue

Diesel-Electric Locomotive Orders

Road and builder	No. of units	Horse-power	Service	Other detail
CANADIAN NATIONAL:				
General Motors Diesel	55	1,200	Road switching	Delivery of these 151 units scheduled for this year.
	26	1,750	Road switching	
Montreal Locomotive Works	45	1,800	Road switching	
	14	1,800	Passenger	
	11	1,000	Yard switching	

Freight-Car Orders

Road and builder	No. of Cars	Type of car	Cap., tons	Other detail
ATCHISON, TOPEKA & SANTA FE:				
Company shops	25	Flat	—	88 ft. for piggyback service. For first quarter delivery.
AMERICAN REFRIGERATOR TRANSIT:				
Pacific Car & Fdry.	300	Refrigerator	40	Estimated unit cost, $13,500. Delivery scheduled for July.
ANN ARBOR:				
American Car & Fdry.	152	Covered hopper	—	Delivered.
MINNEAPOLIS, ST. PAUL & SAULT STE MARIE:				
Pullman-Standard	60	Covered hopper	70	For delivery this month.
UNION PACIFIC:				
American Car & Foundry	200	Gondola	70	———
	52	Covered hopper	70	———
Bethlehem Steel	200	Gondola	70	———
Pullman-Standard	48	Covered hopper	70	———
	200	Box	50	———
WABASH:				
American Car & Fdry.	102	Covered hopper	70	Delivered.

Inquiries and Notes

FREIGHT CARS:
Chicago, Rock Island & Pacific—Has ordered 30 wooden cabooses to be converted to all steel by International Railway Car. Approximate conversion cost per unit, $12,776.

L. T. Donovan (left), newly appointed assistant executive vice-chairman, Mechanical Division, AAR (pg 14, February issue), and E. W. Gebhardt (right), secretary-treasurer, CDOA.

Gebhardt Becomes Secretary-Treasurer CDOA

Elmer W. Gebhardt has been appointed secretary-treasurer, Car Department Officers' Association. Mr. Gebhardt, who is on temporary leave of absence from the C&NW, is chairman of a special AAR committee studying simplification of methods of determining car repair charges and billing procedures (RL&C, March 1957, page 18). Mr. Gebhardt succeeds Frank H. Stremmel, who resigned after 15 years' service when appointed secretary, Mechanical Division, AAR.

Loading Forest Products

The AAR has called attention to modifications of Items "C" and "G" of Fig. 6 and specifications and drawing for Fig. 9.

(*Continued on page 22*)

Interchange Rules on Wheels Clarified

The AAR has advised the fundamental principle that car owners standard should be maintained as outlined in Par. 1, Rule 16, of the January 1, 1958, revision of Interchange Rules applies with equal force to wheels as to any other detail of construction or kind of material. On this basis, cast-iron wheels that are owners standard may not be arbitrarily replaced by another type to suit convenience of repairing line without owner's authority. Unless a car is stencilled for a "new standard" type of wheel according to Par. 3, Rule 16, the original standard should be replaced in kind.

While the schedule governing billing procedures in Rule 10 permits full charge for steel wheels applied in place of cast-iron wheels removed account owners defects, it does not automatically authorize the repairing line at its own discretion to make such applications without regard to the owners standard. The absence of a penalty charge in schedules of Rule 10 does not circumvent or justify the repairing line to disregard the provisions of Rule 16.

No penalties are provided, but full charge is permitted where wrought-steel or cast-steel wheels are sugstituted for each other, and the Arbitration Committee feels that it would be inequitable to perpetuate the former penalty in cases where modern and better quality steel wheels are substituted for cast iron wheels. Substitutions of this kind are generally due to unavoidable or temporary shortage, or for purpose of conforming with the owner's "new standard." It is not intended the repairing line should suffer a penalty where the owner received the benefit of an improved wheel and the settlement value of car is benefited more than the increase charged.

Dollar Cost of Dirt in Diesels

At a Joint Meeting of the Railroad Division of the American Society of Mechanical Engineers and the Land Transportation Committee, American Institute of Electrical Engineers to be held in the Hotel Statler, Cleveland, Ohio, on April 9 and 10, railroad men and manufacturers will get together for the purpose of determining what kind, and how much cleaning should be done on diesel locomotives and equipment.

The electrical men will present eight papers and the mechanicals six.

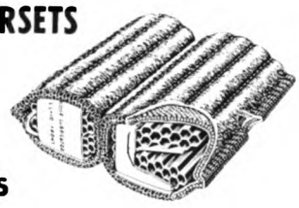
Subjects covered will include "Practical and Economic Limitations of Cleaning", "Practical Air Filtration", "Effects of Dirt", "Ventilation", "Rail Adhesion", "Wheel Slip Detection", "Use of Computers", "Locomotive Design", Vibration and Shock, etc.

Summary of Monthly Hot Box Reports

Month	Cars set off between terminals with Hot Boxes: System	Foreign
November 1953	1.987	3.404
November 1954	2.515	3.467
1955		
November	2.010	3.972
December	1.819	3.774
1956		
January	2.029	4.302
February	2.570	5.611
March	2.517	6.212
April	3.202	6.881
May	4.672	10.903
June	6.777	15.125
July	8.484	16.067
August	9.891	16.892
September	6.834	12.629
October	4.357	8.429
November	2.650	5.560
December	2.256	4.436
1957		
January	3.373	6.121
February	3.272	6.844
March	3.164	6.687
April	3.949	8.447
May	6.580	12.691
June	8.285	16.277
July	10.438	18.819
August	9.662	17.639
September	6.736	12.066
October	4.616	8.050
November	2.839	4.762

153,000 CARSETS
TO DATE

MILLER PAD
LUBRICATORS



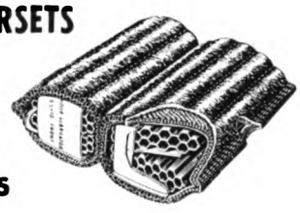
FOR PROGRESSIVE
RAILROADING

as of December 1, 1957

THE NORFOLK AND WESTERN HAS
4,294 CARS OF 50 AND 70 TON CAPACITY
EQUIPPED WITH MILLER CENTER-FEED
PADS WHICH ARE CURRENTLY MAKING
10,722,000 MILES PER SET OUT

161,000 CARSETS
TO DATE

MILLER PAD
LUBRICATORS



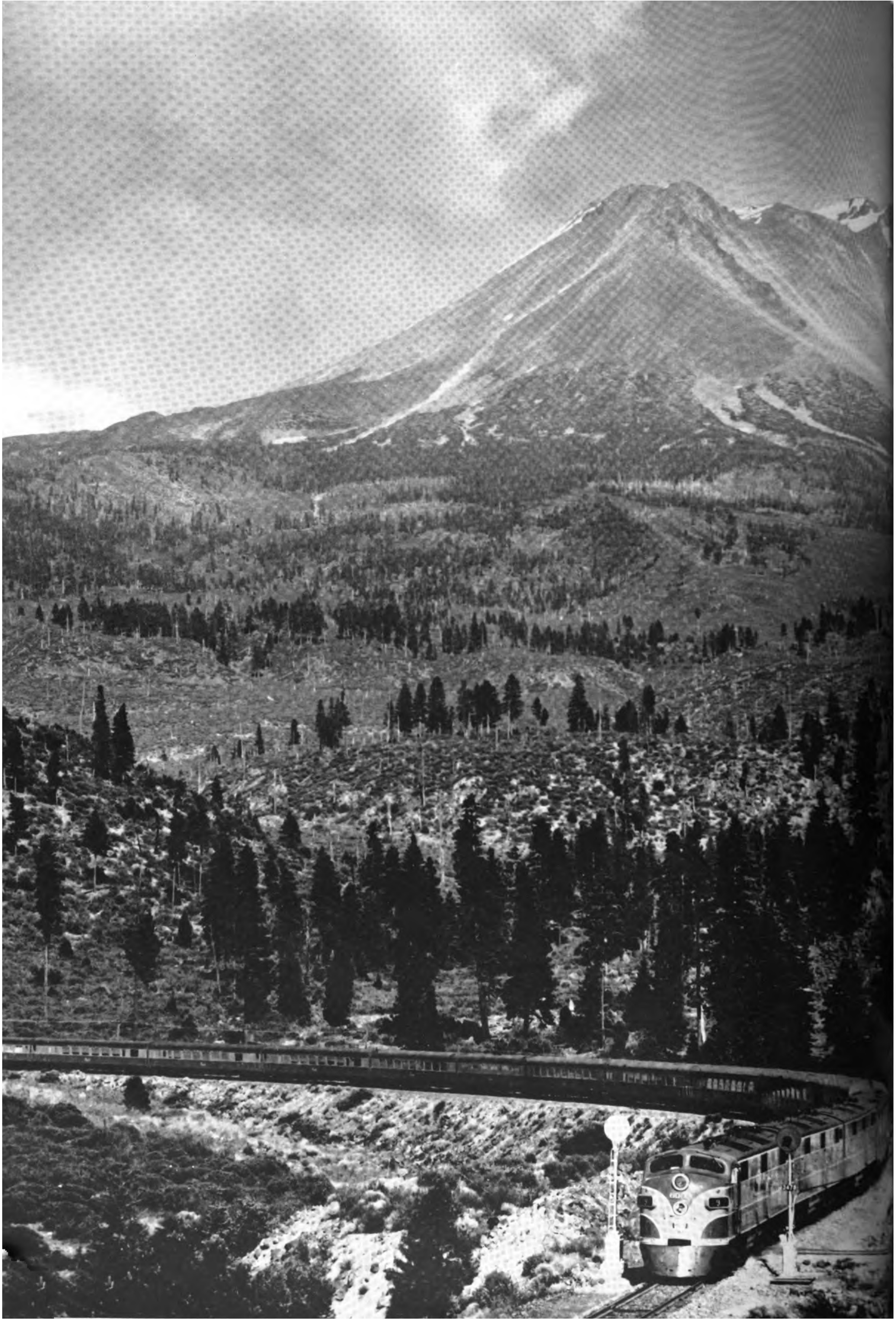
FOR PROGRESSIVE
RAILROADING

as of January 1, 1958

THE NORFOLK AND WESTERN HAS
4,610 CARS OF 50 AND 70 TON CAPACITY
EQUIPPED WITH MILLER CENTER-FEED
PADS WHICH ARE CURRENTLY MAKING
13,539,000 MILES PER SET OUT

$40 Per Carset In U.S.A. 10,000 Carsets always on hand
Field service is available

MILLER LUBRICATOR CO., WINONA, MINN.
In Canada: Napanee Iron Works, Napanee, Ont. and Montreal, Que.



COBRA® SHOES chosen for 6 crack trains

Southern Pacific obtains good results with Cobra Shoes in runs through the mountainous country along the Pacific Coast.

After checking operating performance on two Shasta Daylight trains running between Oakland, California and Portland, Oregon, the Southern Pacific is currently converting five more crack passenger trains to Cobra Shoes.

The Shasta Daylight run is a high-speed run through the Cascade Mountains with heavy grades requiring many brake applications. On this run, through an entire winter of operation, Cobra Shoes gave long life, produced smooth stops, and noticeably reduced operating noise levels.

When installations are complete, two Shasta Daylights (Oakland-Portland), two Coast Daylights (San Francisco-Los Angeles) and two San Joaquin Daylights (Los Angeles-Oakland) will be fully equipped with Cobra Shoes.

Wet or dry—hot or cold—Cobra Shoes meet existing standards for stopping distances. This *all-weather performance* has been proved in thousands of miles of actual railroad service. Why not get the complete story from our nearest representative?

® *Registered U. S. Trademark, Composition Brake Shoes*

The COBRA SHOE

Product of the combined research facilities of . . .

Westinghouse Air Brake Company
Specialists in Braking

Johns-Manville
Specialists in Friction Materials

The Shasta Daylight snakes around a curve at the base of stately Mount Shasta in northern California. This is typical of the rugged mountain and river country through which the train passes on its daily trips between the San Francisco Bay Area and Portland.

RAILROAD FRICTION PRODUCTS CORPORATION

Wilmerding, Pennsylvania

(*Continued from page 18*)

Pamphlet No. MD-3—Rules Governing the Loading of Forest Products in Open Top Cars. These changes and additions will be included in the next revision of Pamphlet MD-3. In the meantime, the AAR advises that shipments will be loaded in accordance with these new and revised specifications and cars so loaded will be accepted in interchange.

Extension Granted on Riveted Coupler Yokes

The AAR has granted an extension of time from March 1, 1958, to January 1, 1959, when couplers having yokes riveted directly to the couplers will be prohibited on all cars in interchange.

The General Committee has also requested the railroads and private car owners to make quarterly reports, starting March 1, 1958, and continuing at three-month periods showing the progress made in replacement of riveted type with cast steel type. Any design of yoke used in these replacements must meet the requirements of Specification M-20S-56—Coupler Yokes.

Selected Motive Power and Car Statistics

• Freight Service

M-211 Item No.		Month of November 1957	Month of November 1956	11 months ended November 1957
3	Road locomotive miles (000):			
3-06	Total, Diesel-electric	35,484	37,085	403,778
3-07	Total, electric	633	696	7,576
3-04	Total, locomotive-miles	37,629	41,632	435,866
4	Car-miles (000,000):			
4-03	Loaded, total	1,520	1,663	17,687
4-06	Empty, total	1,007	972	10,605
6	Gross ton-miles-cars, contents and cabooses (000,000):			
6-03	Total in Diesel-electric locomotive trains	105,919	107,623	1,195,250
6-04	Total in electric locomotive trains	2,008	2,157	24,008
6-06	Total in all trains	113,182	120,937	1,299,478
10	Averages per train-mile (excluding light trains):			
10-01	Locomotive-miles (principal and helper)	1.02	1.02	1.02
10-02	Loaded freight car-miles	42.9	42.8	43.3
10-03	Empty freight car-miles	28.4	25.0	26.0
10-04	Total freight car-miles (excluding caboose)	71.3	67.8	69.3
10-05	Gross ton-miles (excluding locomotive and tender)	3,195	3,113	3,182
10-06	Net ton-miles	1,417	1,423	1,446
12	Net ton-miles per loaded car-mile	33.0	33.2	33.4
13	Car-mile ratios:			
13-03	Per cent loaded of total freight car-miles	60.2	63.1	62.3
14	Averages per train hour:			
14-01	Train miles	19.1	18.7	18.8
14-02	Gross ton-miles (excluding locomotive and tender)	60,366	57,473	59,160
M-240 Item No.				
14	Miles per Diesel-electric unit day			
14-01	Road freight units	204.3	....	208.7
14-02	Road passenger units	421.2	....	438.7
17	Car-miles per freight car day:			
17-01	Serviceable	45.7	47.5	46.0
17-02	All	43.6	45.8	44.1
18	Average net ton-miles per freight car-day	867	960	920
19	Per cent of home cars of total freight cars on the line	110.4	111.7	110.6

• Passenger Service

M-213 Item No.				
3	Road motive-power miles (000):			
3-06	Diesel-electric	18,225	19,300	212,991
3-07	Electric	1,028	1,188	12,459
3-04	Total	19,509	20,935	228,741
4	Passenger-train car-miles (000):			
4-08	Total in all locomotive-propelled trains	197,604	213,632	
4-11	Total in Diesel-electric locomotive trains	183,223	195,563	2,167,929
12	Total car-miles per train-mile	9.56	9.72	9.72

• Yard Service

M-215 Item No.				
1	Freight yard switching locomotive-hours:			
1-03	Diesel-electric[1]	3,602,787	3,857,274	41,439,193
1-06	Total	3,709,264	4,102,708	43,135,201
2	Passenger yard switching hours:			
2-93	Diesel-electric[1]	231,737	241,035	2,635,182
2-06	Total	258,124	273,140	2,940,234
3	Hours per yard locomotive-day:			
3-02	Diesel-electric	14.7	16.0	15.2
3-05	Serviceable	15.0	16.0	15.5
3-06	All locomotives (serviceable, unserviceable and stored)	13.8	14.9	14.2
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.69	1.71	1.69
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	0.80	0.79	0.77

[1] Excludes B and trailing A units.

Personal Mention

Canadian National.—*Moncton, N. B.:* WILLIAM H. BOULAY, superintendent of motive power, appointed district superintendent of motive power and car equipment. BLISS E. LOCKHART appointed instructor of supervisory training, Atlantic region. Formerly locomotive and car foreman at Charlottetown.

Chicago & North Western.—*Chicago:* A. J. CURCIO appointed mechanical inspector-cars.

Chicago, Milwaukee, St. Paul & Pacific.—*Milwaukee:* G. L. WOOD, appointed superintendent car department, succeeding C. E. BARRETT, deceased. Formerly district general car foreman, Minneapolis. P. J. LUCAS appointed assistant superintendent motive power. T. J. KUBAL appointed general road foreman of engines, system, succeeding Mr. Lucas. Duties of A. M. HAGAN, district master mechanic, Milwaukee shops, extended to include supervision over locomotive department matters, first, second and third districts, Milwaukee Division, and first district, LaCrosse and River Division. V. L. GREEN, assistant superintendent car department, appointed assistant mechanical engineer—car department. J. J. DRINKA appointed assistant to superintendent car department. J. HANSEN, assistant superintendent car department, appointed shop superintendent, succeeding Mr. Drinka. *Savanna, Ill.:* Duties of W. W. HENDERSON, master mechanic, extended to include supervision over Milwaukee wheel and forge shops and Tomah, Wis., shop. *Tacoma, Wash.:* G. J. JOHNSTON, assistant superintendent motive power, appointed district master mechanic, Coast and Idaho Divisions. *Deer Lodge, Mont.:* J. H. KERVIN, assistant master mechanic, appointed master mechanic, Rocky Mountain and Trans-Missouri Divisions. *St. Paul:* W. B. GAGE appointed master mechanic, H&D Twin City Terminal, Duluth Division, LaCrosse and River Division second and third districts, and LaCrosse, succeeding J. L. BROSSARD, retired. *Bensenville, Ill.:* R. E. MAGNUSON appointed master mechanic of Bensenville and the Terre Haute Division, succeeding L. H. KOCH, retired.

Great Northern. *Spokane, Wash.:* RICHARD G. TAUSCH, assistant shop superintendent, appointed superintendent of shops, succeeding A. H. MALENKE, retired.

Long Island.—*Morris Park, N. Y.:* R. W. WALLENDORF appointed assistant mechanical engineer. H. V. TOZER appointed foreman diesel shop.

Louisville & Nashville.—*Louisville, Ky.:* J. F. RYAN appointed assistant general manager. C. N. WIGGINS appointed chief mechanical officer, succeeding Mr. Ryan. W. I. JOHNSON, JR., appointed assistant chief mechanical officer-equipment, succeeding Mr. Wiggins. J. F. SAPP appointed mechanical engineer, succeeding Mr. Johnson. J. R. DOUGLASS pointed assistant manager, planning-pro tion, succeeding Mr. Sapp. D. A. REA appointed superintendent of equipment, ceeding Mr. Douglas. C. R. RABBETH pointed assistant superintendent of equi succeeding Mr. Reavis. Formerly g foreman, car department, South Lo

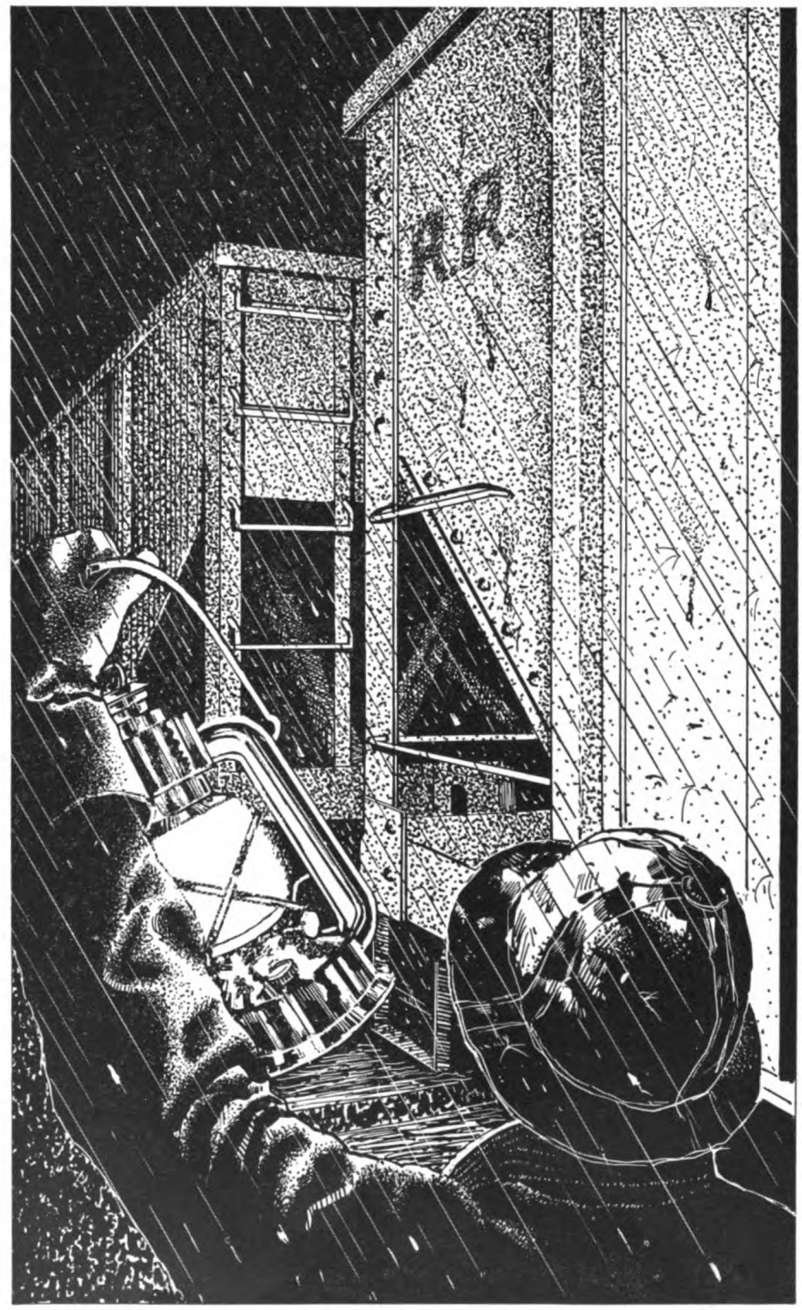
Missouri Pacific. —*St. Louis;* O. L. H pointed assistant chief mechanical *Little Rock, Ark.:* G. W. NIEMEYER Mr. Hope as mechanical superinte Southern district. *North Little Ro* EUGENE MCNABB replaces Mr. Niem terminal master mechanic.

New York Central. *Buffalo:* J. S. FA pointed master mechanic, Buffalo

New York, New Haven & Hartford.—N CHARLES C. SHANNON elected vice-pr operations, in charge of operating, e

(*Continued on page 72*)

How Armco High Strength Steel
Can Help Cut Costly Corrosion of Cars



It is estimated that corrosion of rolling stock costs railroads more than $300,000,000 every year! Obviously, any way of cutting down on this loss can mean important savings in maintenance and replacement.

Armco High Strength Steel is a good solution. This special low-allow, high-strength steel offers from *4 to 6 times* the atmospheric corrosion resistance of ordinary carbon steel. And it's much stronger —more resistant to damage.

When used in the same gage sheets as ordinary carbon steel, for example, this durable steel delivers much longer car life at greatly reduced cost per year of service. In addition, Armco High Strength Steel holds paint longer, and can be readily welded or fabricated into car parts.

Let us give you or your car builder full information about low-cost, low-alloy Armco High Strength Steel. Just fill in and mail the coupon or contact the Armco Sales Office nearest you.

ARMCO STEEL CORPORATION
1538 Curtis Street, Middletown, Ohio

Send me complete data on
Armco High Strength Steel.

NAME_____

TITLE_____

FIRM_____

STREET_____

CITY_____ ZONE____ STATE_____

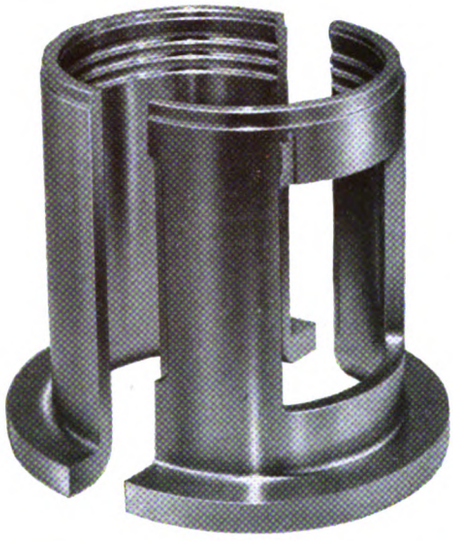
ARMCO STEEL

ARMCO STEEL CORPORATION • 1538 CURTIS STREET, MIDDLETOWN, OHIO

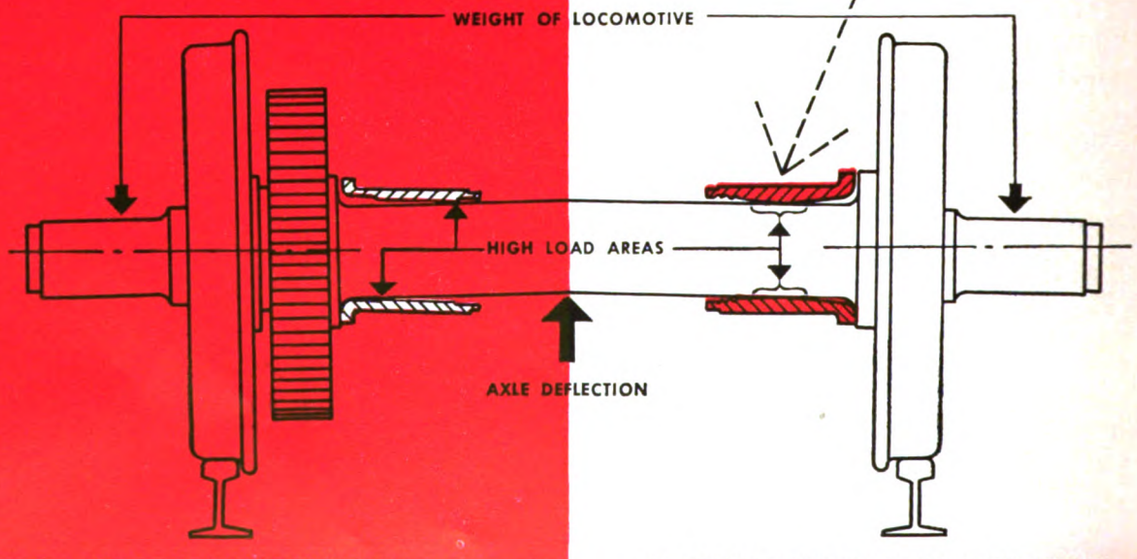
SHEFFIELD DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Now, from ELECTRO-MOTIVE

1 TRACTION MOTOR SUPPORT BEARINGS WITH EXTRA LIFE, HOURGLASS DESIGN



Electro-Motive modified hourglass bore design compe
sates for axle deflection to eliminate end-loading an
provide better lubrication. Result: A longer service li
than straight-bore bearings.



STRAIGHT-BORE BEARINGS
are heavily loaded at the ends which prevents adequate lubrication. Because of this, straight-bore bearings are subject to stresses that start "shell-outs" or fatigue cracks which shorten life or cause premature failures.

MODIFIED HOURGLASS BORE BEARINGS
fit the normally deflected axle to provide a greater bearing surface, eliminate end loading and permit thorough lubrication. In addition, special circular grooves in the Electro-Motive bearing return excess oil (lost on straight-bore bearings) to the axle reservoir to be used over and over.

2

A NEW SALES-EXCHANGE PLAN TO CUT REPLACEMENT COSTS

In addition to the initial low cost d extra life of Electro-Motive traction)tor support bearings, a new sales- :hange plan has been established that ı lower your cost as much as seven : cent.

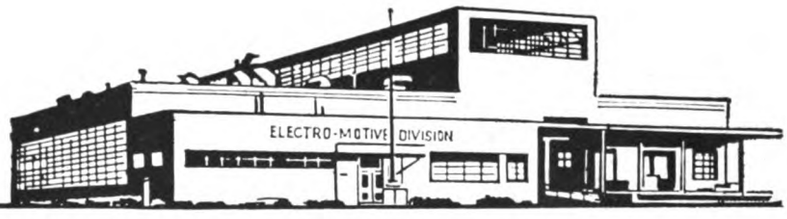
Among the plan's many features is a w and generous "scrap allowance" for y worn traction motor support bearings you turn in on the purchase of Electro-Motive hourglass bearings.

Before you order traction motor support bearings again, be sure to check the advantages of the Electro-Motive hourglass bearing and the savings you can get under our new sales-exchange plan. For complete details on both, see your Electro-Motive representative.

ne convenient on-line warehouses for fast delivery parts and Unit Exchange components.

Angeles, Calif.
eryville, Calif.
rth Salt Lake City, Utah
)ertson, Mo.
nneapolis, Minn.
Grange, Ill.
:tory and parts center)

Halethorpe, Md.
Jacksonville, Fla.
Fort Worth, Texas



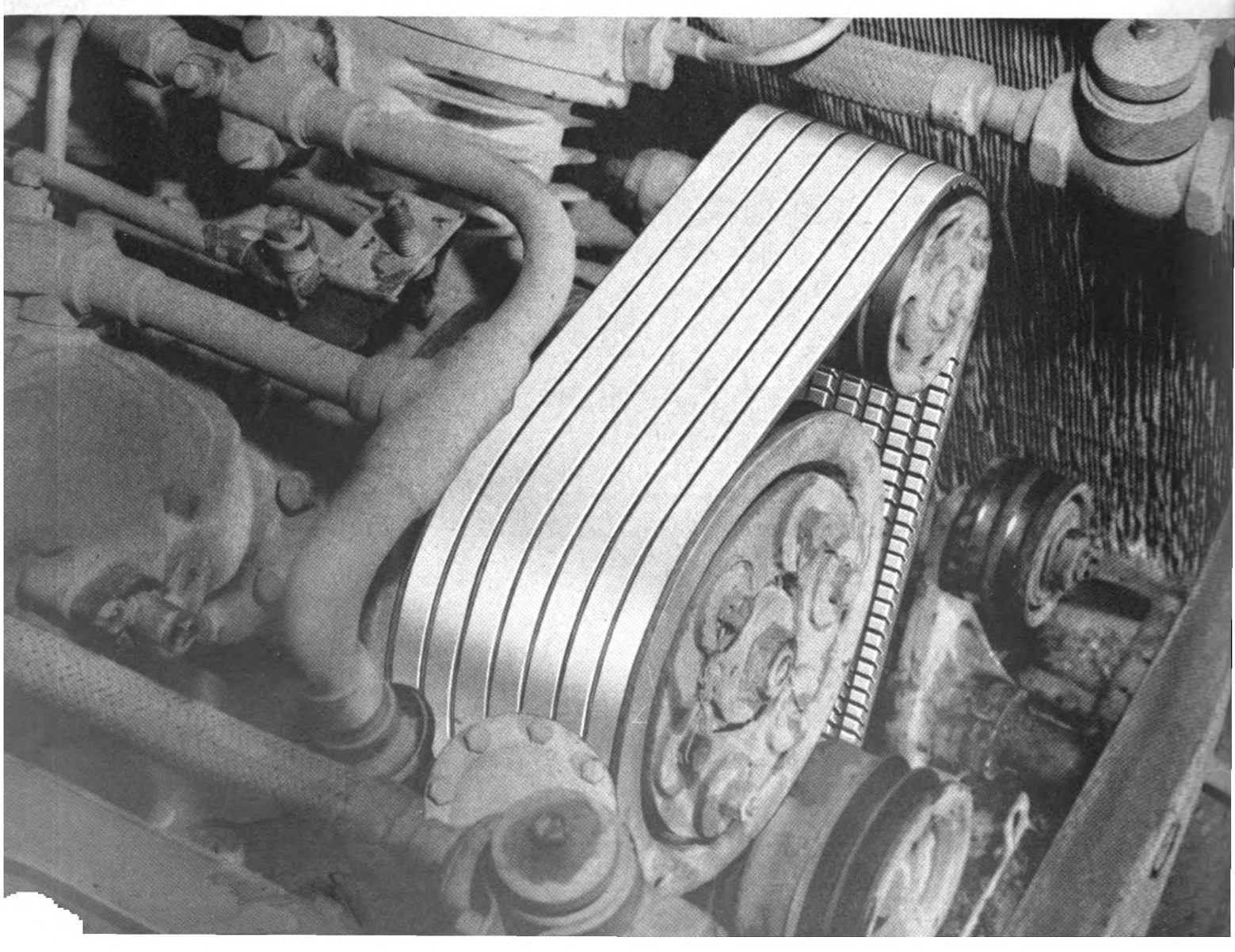
ENERAL MOTORS LOCOMOTIVES

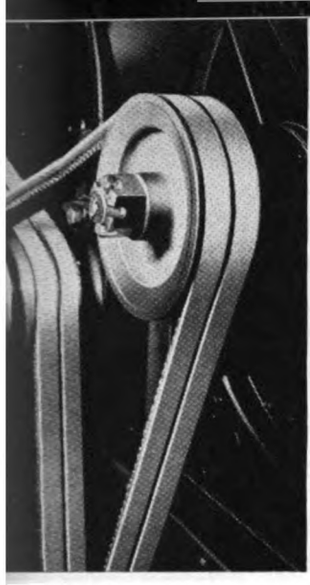
ELECTRO-MOTIVE DIVISION
GENERAL MOTORS

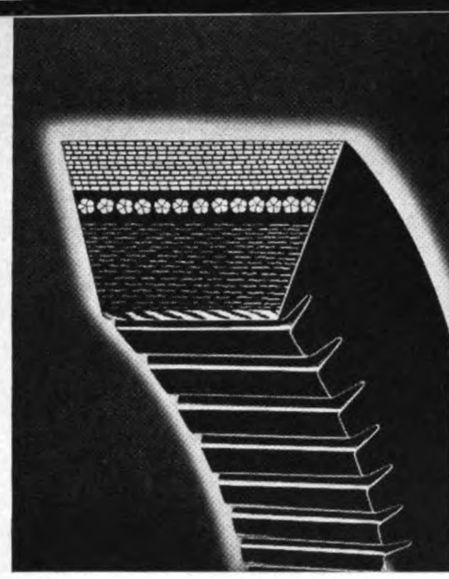
LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*
In Canada: General Motors Diesel Limited, London, Ontario

Dayton Cog V-Belts are ruggedly built of special materials processed to withstand the punishment of tougher railway service.

Major railroad cuts drive costs in half with







Dayton Endless Cog-Belts provide tremendous gripping power, have great tensile strength, amazing flexibility lengthwise and are heat and oil resistant.

)ayton Endless Cog-Belts*

Seaboard Airline reduces diesel and air conditioning drive replacement costs 50% by switching to Dayton Endless Cogs.

It all started when the Seaboard Airline Railroad called in Dayton Field Engineers to find a means of improving drive performance. A change-over to Dayton Endless Cog-Belts—stronger by over 40% than standard V-Belts—was recommended and the change was made.

Belt failures became few and far between . . . the need for maintenance and service dwindled to an all-time low . . . savings in time and labor grew to important amounts . . . replacement V-Belt costs dropped to *half* of that expended in previous years when other drives were used.

Now Seaboard Airline uses Dayton V-Belts and Cog-Belts exclusively for all diesel and air-conditioning drives as well as for all special applications.

Savings like these, experienced by almost every railroad in the country (Dayton V-Belts are original equipment on over 90% of all types of diesels) are available to your railroad, too. Why not write Dayton Rubber Co., Railway Division, Dayton 1 Ohio, and learn how you can improve performance, lower costs with Dayton V-Belts for every drive requirement.

© D. R. 1958

*T.M.

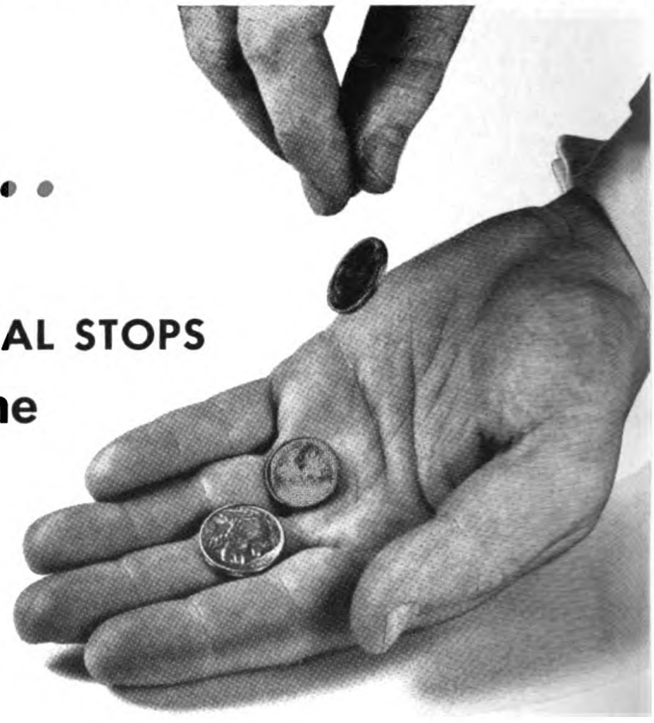
Dayton Rubber

World's Largest Manufacturer of V-Belts

Specialized Railroad Representatives in Atlanta, Chicago, Cleveland, Dallas, Dayton, Minneapolis, Moline, New York, San Francisco, and St. Louis

HOW SOLID BEARINGS AND JOURNAL STOPS HELP KEEP RAILROADS OUT OF THE RED

It's a fact...



that MAGNUS R-S JOURNAL STOPS can cut the cost of routine bearing inspection to less than 7 cents per car per day

With this and other cost reductions, Journal Stops can save you about $35 a year on every freight car!

PACKING seldom needs adjustment when R-S Journal Stops are applied. That's why they can cut car oiler's time in half, reduce annual journal-box servicing costs to $24.11—only 6.6 cents per day.

But that's not all. When you stabilize the solid bearing assembly with R-S Journal Stops, practically all other bearing operating costs are reduced too. In fact railroads using Journal Stops report total savings of about $35 a year on each car.

Journal Stops prevent displacement of bearing and wedge under impact and braking forces —help provide uniform, uninterrupted oil film lubrication, give the solid bearing a chance to work at optimum efficiency *all the time*. They double bearing life, reduce wheel flange wear, prevent dust guard damage, cut truck maintenance all along the line.

Today there are more than 7,000 freight cars equipped with R-S Journal Stops. In service, they have increased hot box mileage 10 times—cut hot box costs to a tenth of current costs on similar cars in similar service. That means less than ⅓ cent per car per day to cover all costs associated with bearing road failures.*

Yes—this is the low-cost solution to the hot-box problem. A solution that retains all the inherent advantages of standard AAR solid journal bearings. For *all* the facts, write to Magnus Metal Corporation, 111 Broadway, New York 6, N.Y., or 80 E. Jackson Blvd., Chicago 4.

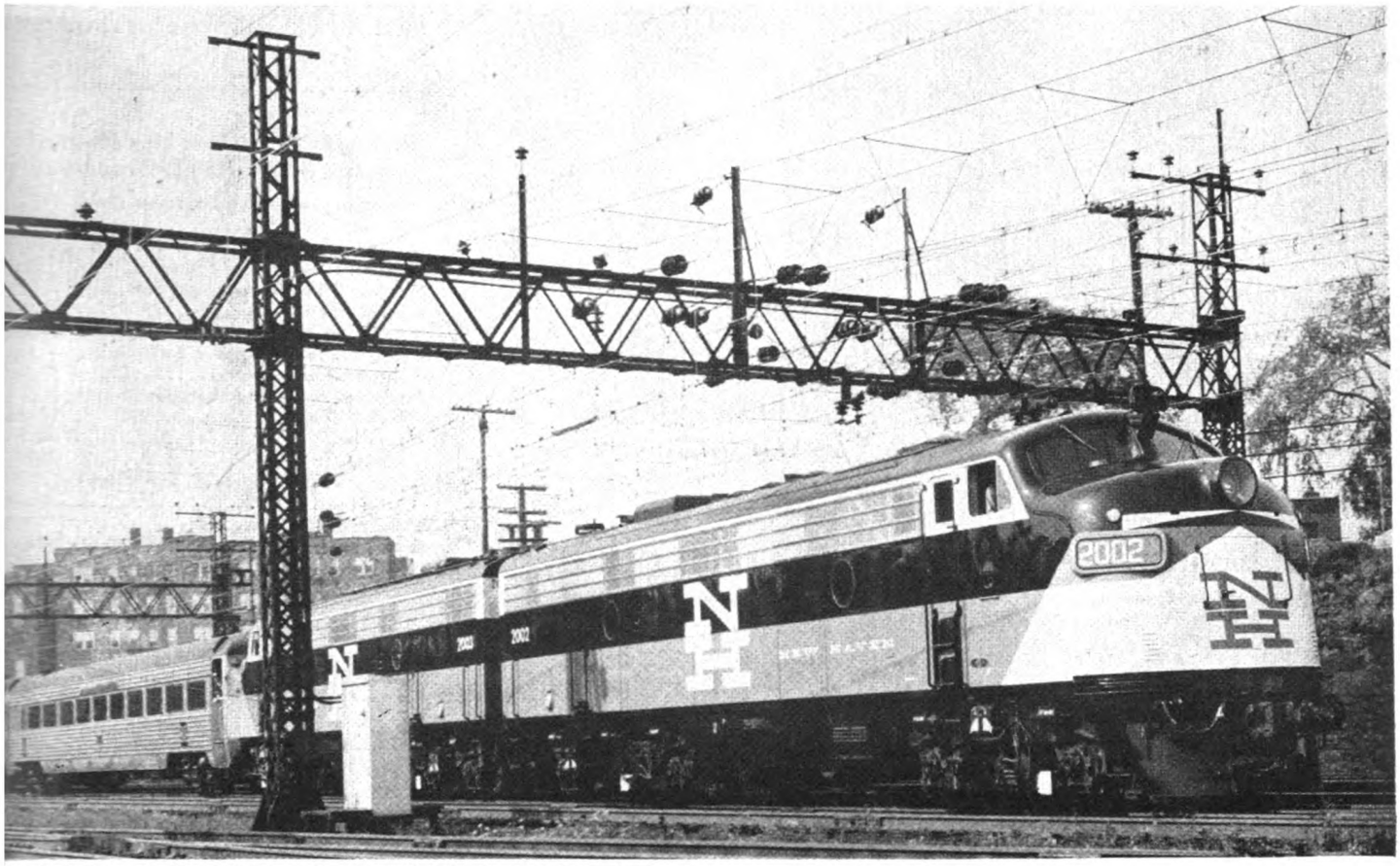
**Cost based on data compiled by the Mechanical Division of the Association of American Railroads in 1955.*

MAGNUS

Solid Bearings

Right for Railroads
...in performance...in cost

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**



ew look under the New Haven's wire is provided by the 30 EMD units w pulling many of the road's New York to Boston passenger trains.

lectro-Motive's Newest Model . . .

L-9's Are Changing New Haven Operations

he Electro-Motive Division of General Motors has added a new model to its ne of standard locomotives. The FL-9, our feet longer than the standard FP-9 assenger locomotive, contains all the quipment necessary to make it a full-nge electric as well as a diesel. Each ,750-hp unit has a maximum speed of 9 mph and is equipped with a 16-ylinder 567C diesel engine and four 47 traction motors.

Thirty of these diesel-electric-electric nits are now in service on the New aven. Tests have been conducted with iem on the New York Central and the ennsylvania. The FL-9 can pull stand-d passenger or freight trains and is signed to enter and leave direct-cur-nt third-rail territory without slowing down to change from diesel to straight electric operation and vice-versa. It can operate both in Grand Central and Pennsylvania stations in New York.

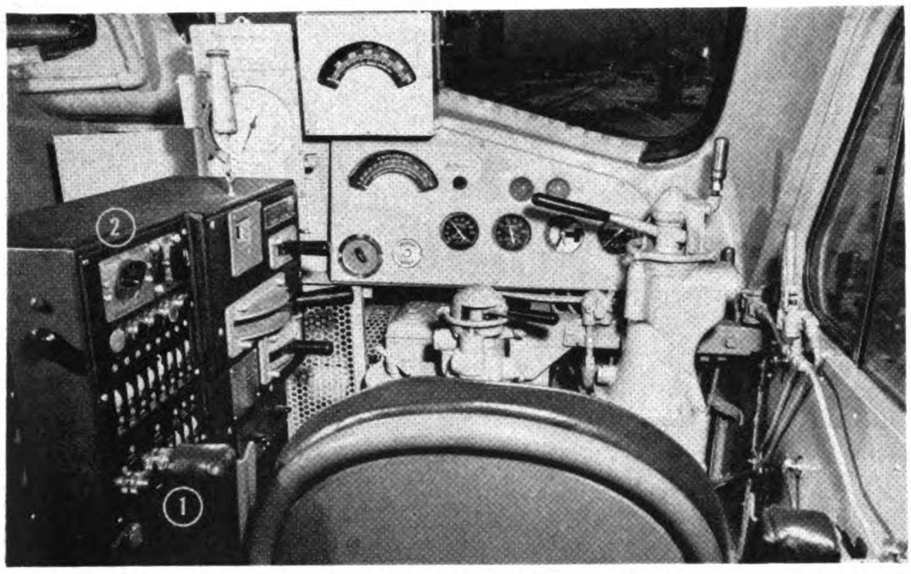
The New Haven is operating its thirty units as fifteen, 3,500-hp, two-unit locomotives between Grand Central and Boston. This territory is electrified with 600 volts d-c from Grand Central to Woodlawn, 11,000 volts a-c from Woodlawn to New Haven, and is not electrified between New Haven and Boston. The locomotives operate as 600 volt d-c electrics out of Grand Central, and then as regular diesels to Boston.

The New Haven's electric locomotives and multiple-unit cars used on the 72-mile line from Grand Central to New Haven are designed to operate from the New Haven's 11,000 volt a-c overhead. Like the FL-9's, they operate on 600 volts d-c when in third-rail territory. They make the d-c to a-c, or a-c to d-c, transition without stopping. Baldwin, Budd and Fairbanks-Morse have built diesel-powered, lightweight equipment for the New Haven which also operates from third rail in the Grand Central area.

The FL-9 design depends on building the locomotive so its traction motors can draw power directly from the third rail when the diesel engines are shut down. Modification of the dynamic braking resistors for traction control and some newly developed automatic controls did the trick.

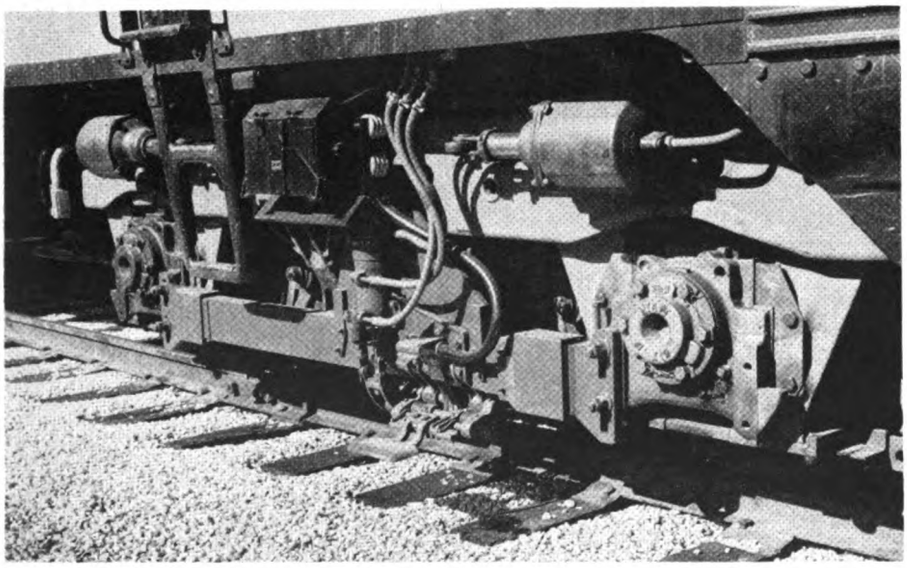
Continued ▶

Cab Controls



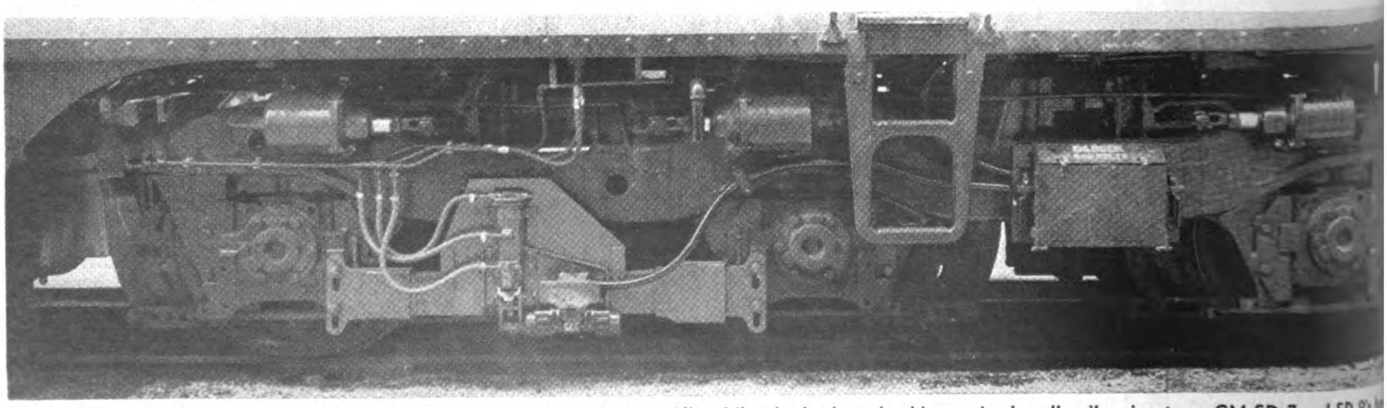
Cab control stand on FL-9 does differ from standard EMD arrangement. Included are (1) control for raising and lowering the third rail shoes, and (2) acceleration rate selector.

Front Truck



All-coil-spring leading truck without swing hangers makes it possible to mount the beam for the third rail shoe assembly. Similar truck was first applied to GM switchers.

Rear Truck



Six-wheel rear truck keeps axle loading under 58,000 lb. Center axle is an idler. Like the lead truck, this one is also all coil spring type. GM SD-7 and SD-9's h similar truck.

(Continued from preceding page)

The engineer controls transition from diesel to electric operation at the regula control stand. When about ready t leave the third-rail area, the diesel en gines are started while the train is at speed. Another set of controls cuts off the third rail and power is then drawn

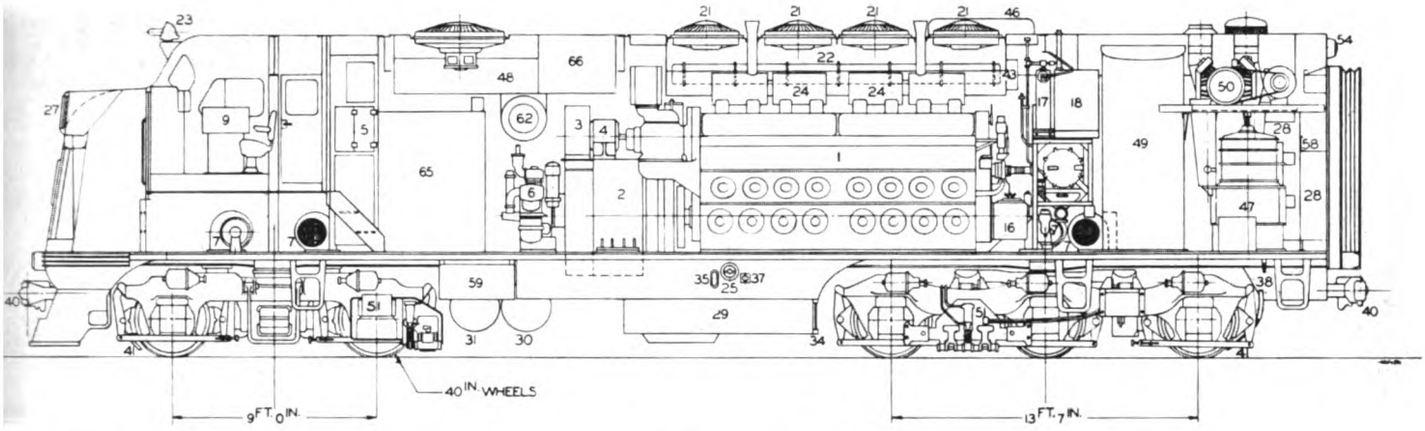
Principal Dimensions New Haven's Two-unit 3,500-Hp FL-9 Locomotive

Length between coupler faces (Two A units), ft in.	117-4
Overall wheel base, ft in.	105-0
Maximum width over cab steps, ft in.	10-6
Maximum height over exhaust stacks, ft in.	14-8
Number of third-rail shoes	8
Overhead, 660-volt, d-c collectors for terminal use	2
Third-rail operating voltages (d-c):	
Maximum	720
Nominal	600
Minimum	400
Driving wheels, number and diameter (in.)	16-40
Gear ratio	58:19
Maximum total loaded weight, lb	580,000
Maximum total loaded weight on drivers, lb	464,000
Fuel, gal	2,400
Water for train heating, gal	2,600
Sand, cu ft	32
Lubricating oil, gal	400
Engine cooling water, gal	453

from the diesel generator. When clear of the third rail, the shoes are folded up and the train operates as a normal diesel.

Flexicoil Trucks

Newly developed Flexicoil trucks, with a double coil-spring arrangement instead of swing hangers to control lateral, have been used to make possible the application of third-rail pickup shoes. Special ears on the journal boxes hold the third-rail shoe beams which are mounted between the boxes on each side of each truck. The spring-loaded third-rail shoes



Engine EMD Model 16-567C
Main generator and alternator
Generator blower
Auxiliary generator
Control cabinet
Air compressor
Traction motor blower
Control stand
Cab seat
Lube oil filler
Lube oil cooler
18 Engine water tank
21 36 in. fan and motor
22 Radiator
23 Horn
24 Exhaust manifold
25 Fuel filler
27 Headlight—fixed beam
28 Batteries
29 Fuel tank—1200 gal.
30 Main air reservoir—No. 1
31 Main air reservoir—No. 2
34 Fuel tank sight glass
35 Fuel tank gage
37 Emergency fuel cut-off
38 Engine water filler
40 Coupler
41 Sanding nozzles
43 A-C cabinet
46 Winterization hatch
47 Steam generator
48 Dynamic brake and accelerating resistors
49 Water tank—1300 gal
50 Air compressor—Electric driven
51 Third-rail shoe mechanism
54 Back-up light
58 Jumper-cable rack
62 Motor-generator set
65 Electric locomotive equipment cabinet
66 Hatch cabinet

mponents on FL-9's must include an arrangement for driving a-c powered fans when the diesel engine is shut down.

perated by air, swing on a shaft ıounted on a bracket bolted to the shoe eam. A three-axle truck is used on the ear of unit to keep within the maximum xle loading of 58,000 lb on structures ading into Grand Central. The middle xle is an idler. Each outer axle has a action motor. The front truck has two xles, each with a traction motor.

The FL-9 accelerates automatically hen operating from third rail. On a dial the engineer selects the rate of acceleration which will best avoid slippage, but will permit reaching speed in the shortest time. Once this setting is made, the throttle is opened, the automatic control then regulates acceleration without necessity of moving throttle back and forth to prevent slippage.

When the FL-9 operates as a diesel, conventional power is furnished to the a-c driven traction motor blowers and cooling fans. When operating from third rail with the diesel engine shut down, a motor-generator set operates directly from the third rail. This provides a-c power for the traction motor blowers and d-c power for lighting and controls. A special 600-volt d-c motor drives an air compressor for third-rail operation.

Train heat is provided in each unit by a conventional, oil-fired 2,750 lb per hr steam-heat generator.

Hot Dog' Tank Car oses Run Boards

Union Tank Car Company has petioned the ICC for permission to elimiate the side running boards on new ınk cars. Already the company has ɔnstructed one car of this type which being held at the UTL shop at Whitıg, Ind., pending ICC action. No hearıg date has yet been sent.

The car is one of 200 UTL tanks hich have been constructed over the ast two years without center sills. The ınk is a part of the car structure and as the draft sills attached directly to ıe bottom. Elimination of the dome rengthens the tank as a structural ıember. This HD (or "Hot Dog") degn has been tested at the AAR laboraɔry.

The new arrangement of center laders and of end platform railings and eps was designed to be safer and more ɔnvenient than the customary styles.

Journal Lubricating Devices—1958

Two million individual lubricators will soon be in service under interchange freight cars in the US and Canada. Shown are the 19 types which can be applied now. Several earlier models are no longer approved, but some continue in service. Even the 19 types are in two classifications: conditionally approved types, and types authorized for limited test applications. *At the moment, there are none with unqualified AAR approval.* Free oil should be kept at a level 1½-in. below the axle end collar in all boxes equipped with these devices.

Since last August, lubricators have been required on all new freight cars. Here's how the current interchange rule puts it: "Journal lubricating devices—AAR approved types, conditionally approved types, or types authorized for limited test applications—required on all cars having plain bearings, built new, rebuilt, or receiving heavy repairs to the extent of over 100 manhours, on and after August 1, 1957. From owners. Effective January 1, 1960, this requirement will apply to all cars in interchange."

Of the 19 devices shown on these two pages, only five have conditional approval. These are the Journapak, Miller, Redipak, Rolin, and Uni-Pak types. All the others are authorized for limited test application and are subject to the quotas imposed by the AAR Mechanical Division. This situation changes rapidly. Devices can move from the "test" to the "conditionally approved" classification. New types will undoubtedly be authorized for test soon. No lubricator yet has unqualified AAR approval.

AAR laboratory tests are conducted on each lubricator submitted. It then may be granted approval for test applications. To become conditionally approved, its service must produce a hot box record at least "three times better than is experienced with journal box packing."

This means, according to the AAR Lubrication Committee, not more than 105 set-outs in 54,000 car months. It will be necessary to have a minimum of 18 months service on a lubricator before the "conditionally approved" classification can be applied.

Approval for test purposes in interchange service has been withdrawn from five lubricating devices. Plypak, formerly rated as a lubricator, is now a packing retainer.

Lubricator Chart

This information on journal lubricators will be available in chart form by April. Suitable for bulletin boards, this 21-in. by 28-in. chart will be printed on heavy paper stock. Price: 75 cents per copy; reduced prices for quantity orders. Order from *Railway Locomotives and Cars*, 30 Church St., New York 7, N. Y.

Ajax Easy-Pak Lubricator

Ajax-
Consolidated Co.
4615 W. 20th St.
Chicago 50, Ill.

Rope-like unspun cotton wicking woven in loops surrounds pad. Coil springs laced inside keep it in contact with journal. Pad reversible after bottom plastic sheet is removed. Separate types for two types of journal boxes.

Redipak Twin Lubricating Pad

RR Prod. Div.,
American
Brake Shoe Co.
530 Fifth Ave.
New York 36, N.Y.

Cotton wicking covers synthetic foam blocks which have molded cored openings. Oil is fed by compression and wicking action. Fiber retainers snap into position on stop columns. Pad fits both styles of journal boxes.

Cardwell Journal Lubricator

Cardwell-
Westinghouse Co.
332 S. Michigan
Chicago 4, Ill.

Formed neoprene loops are covered with cotton wicking material. Steel springs are molded in the loops to insure that the lubricator will be in contact with the journal at all times. This pad is reversible.

Jeffers Journal Lubricator

Fullo Corporation
2608 Eastwood A
Chicago 25, Ill.

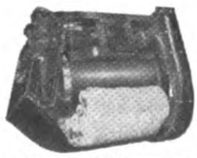
A silicon-impregnated wool-felt wick covers a tempered spring-steel frame to feed oil to the journal surface. Fillet oil seal and lid seal are built into the device, and it is bolted to the box just under the lid opening.

Hennessy Mechanical Lubricator

Hennessy
Lubricator Co.
605 Guilford Ave.
Chambersburg, Pa.

The pad-type oil distributor is fed by a pump actuated by the axle-end movement while the car is running. A special oil-sealing dust guard is used. The bottom of the journal box acts as the oil reservoir for this device.

Hennessy Lube-Pad-13



Hennessy
Lubricator Co.
605 Guilford Ave.
Chambersburg, Pa.

Absorbent foam core and cotton folds feed to journal by capillary action. Install under the journal with arrow pointing up and loop handles toward the box lid. Pad sections run parallel with the journal.

Acme Journal Lubricator

Journal Box
Servicing Corp.
332 S. Michigan
Chicago 4, Ill.

Filled with all-new wool, this lubricator has chenille loops made of 30% wool and 70% cotton. Abrasion-resistant nylon is used at critical wear points. Eighty yarn stays through the pad are intended to improve stability.

ɛnille Roll Journal Packing

Journal Box
Servicing Corp.
332 S. Michigan
Chicago 4, Ill.

se are manufactured chenille packing rolls ch are applied in a manner similar to that conventional packing rolls. Four rolls are l in 5 x 9-in. boxes and five in all larger s. Lubrication through wicking action.

Stapax Lubricator

Lubrication
Products Co.
5605 Herman Ave.
Cleveland 2, O.

This device is made from a cylindrical-shaped felt pad formed around steel springs. Chain spiders are built into the center of the device to prevent rolling. Lubrication of the journal is accomplished by wicking action.

Miller Journal Lubricator

Miller
Lubricator Co.
1150 E. 8th St.
Winona, Minn.

Model 5 lubricator is made from tough, heavy, blanket-like material wrapped around oil-resistant, cellular, synthetic-rubber cores held in place by a treated-cloth harness that closes the ends. Brass rings aid removal.

ır-Waste-Pack Lubricator

Railway Service
and Supply Corp.
510 S. Harding St.
Indianapolis 7, Ind.

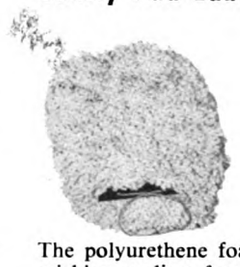
oil-wicking and feeding core of renovated new waste in this lubricator is formed in esilient roll and encased in a short-cotton- envelope. Two units are required for h journal box.

Optimum Journal Lubricator

Railway Service
and Supply Corp.
510 S. Harding St.
Indianapolis 7, Ind.

Two independent pad assemblies are permanently fixed in the box with retainers and locks. The modified, tire-type canvass backing is filled with 2-in. loops of special, pre-shrunk, treated cotton thread.

Utility Pad Lubricator



Railway Service
and Supply Corp.
510 S. Harding St.
Indianapolis 7, Ind.

The polyurethene foam core is enclosed in a wicking medium formed from a modified, tire-type canvass base covered with long loops of special pre-shrunk, treated, cotton thread which has the wax and lint removed.

lin Journal Lubricator

Rolin Corporation
80 E. Jackson Blvd.
Chicago 4, Ill.

s lubricator consists of a lubricating pad l by a flexible cradle. The assembly is perly positioned by two spring clips which nd to the top of the box. Lubrication es from wicking action.

Journapak Journal Lubricator

Security Railway
Products Co.
120 S. LaSalle St.
Chicago 3, Ill.

This three-section, reversible lubricator is made of heavy, tufted, non-glazing cotton chenille wrapped completely around the three blocks of synthetic rubber foam. Separate models are used for each journal size.

Southland Journal Lubricator

Southland
Manufacturing Co.
700 Front St.
Norfolk 10, Va.

A two-piece oil-resistant molded neoprene foam rubber core is enclosed in a heavy cotton wick cloth with loops locked in. A center wick extends down through the core and with the cotton cover provides steady oil supply.

ring-Pak Lubrication Pad

Spring
Packing Corp.
332 S. Michigan
Chicago 4, Ill.

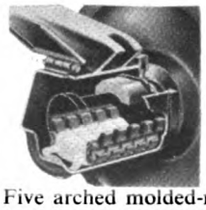
s lubricator has a felt pad covered with -free, cotton wicking. The canvass inner pper protects the center-feed wicks from and encloses the core of spring steel ch maintains contact with the journal.

Uni-Pak Journal Lubricator

Uni-Pak Corp.
Box 8302
Swissvale
Pittsburgh 10, Pa.

Two thicknesses of foam-neoprene elastimer are sewed into a cotton container with specially woven yarn looped through the entire assembly to wick oil from the bottom of the box to the journal surface.

Waughpak Journal Lubricator



Waugh
Equipment Co.
420 Lexington Ave.
New York 17, N.Y.

Five arched molded-rubber fillers are inserted in loops in the fabric jacket to hold this pad firmly against the journal surface. The loops also serve as wicks across the entire face of the journal.

Outside framing on this reinforced concrete structure produces open work spaces along the walls. There are no pits because daily inspection can be made floor and presence of pits could produce unsafe condition during constant car movements.

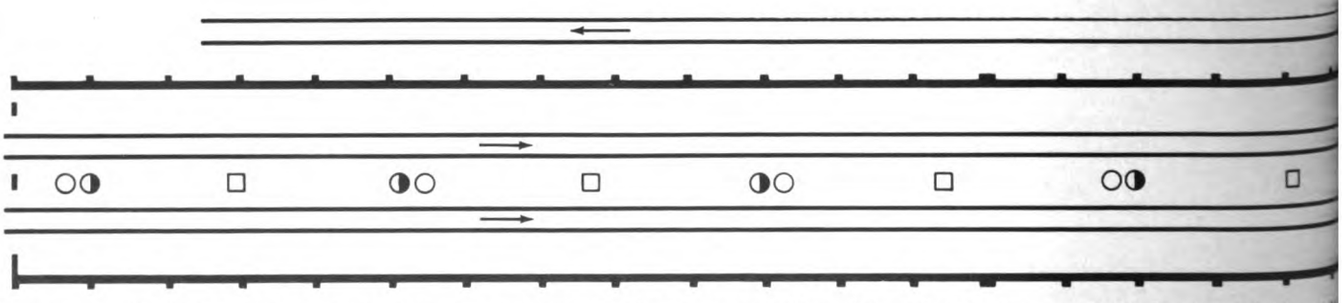
B&M Super Service for RDC's

"A high-speed service station—not a maintenance shop" is the way P. C. Dunn, assistant general mechanical superintendent, Boston & Maine, characterizes his railroad's new RDC shop. Every week day almost every one of the B&M's 108 Budd rail cars makes at least one visit to this new facility. Some come back for a second servicing.

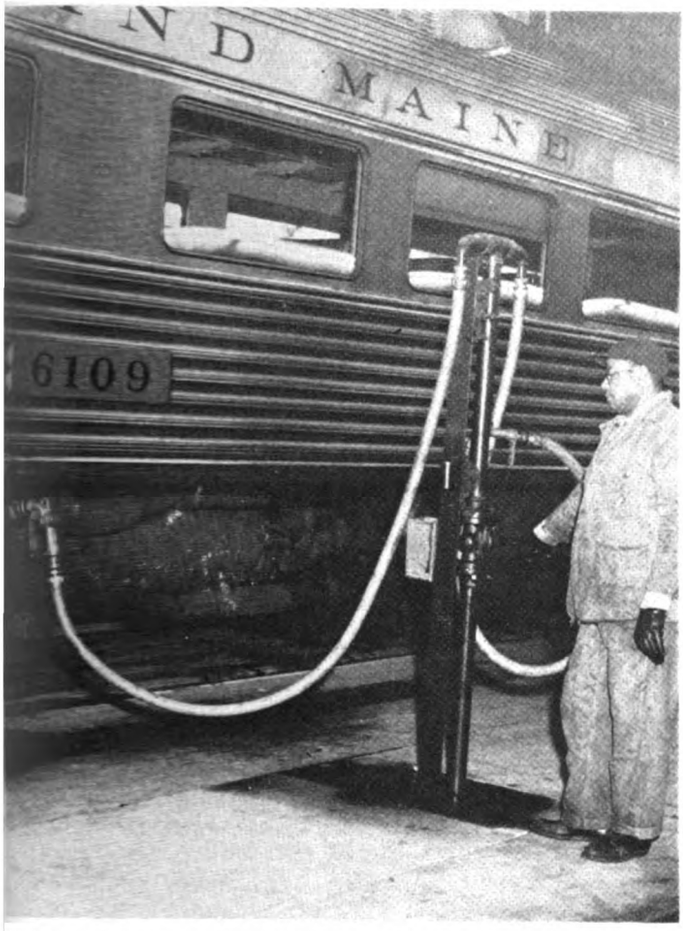
The 1.5-million-dollar plant was designed to (1) utilize manpower efficiently; (2) make servicing time as short as possible; (3) insure adequate inspection with proper facilities, and (4) produce a safe work area. It puts daily servicing on an assembly-line basis. Fuel, treated-engine-water, drinking-water, lube-oil and transmission-oil outlets are so arranged that trains of up to six cars can be completely serviced and inspected in 20 min.

The shop handles 137 cars each week day. These are in 50 trains. The trains vary in make-up all the way from one seven-car train on down to nine single-car trains. Heaviest load is during the first shift when a force of 20 handles 26 trains of 72 cars and dispatches 23 trains of 70 cars. Fifty the cars arrive at the shop between am and 11 am. In the work force machinists and helpers, coach clean and laborers. Electricians and carp handle some repairs but are not of the staff for routine operations.

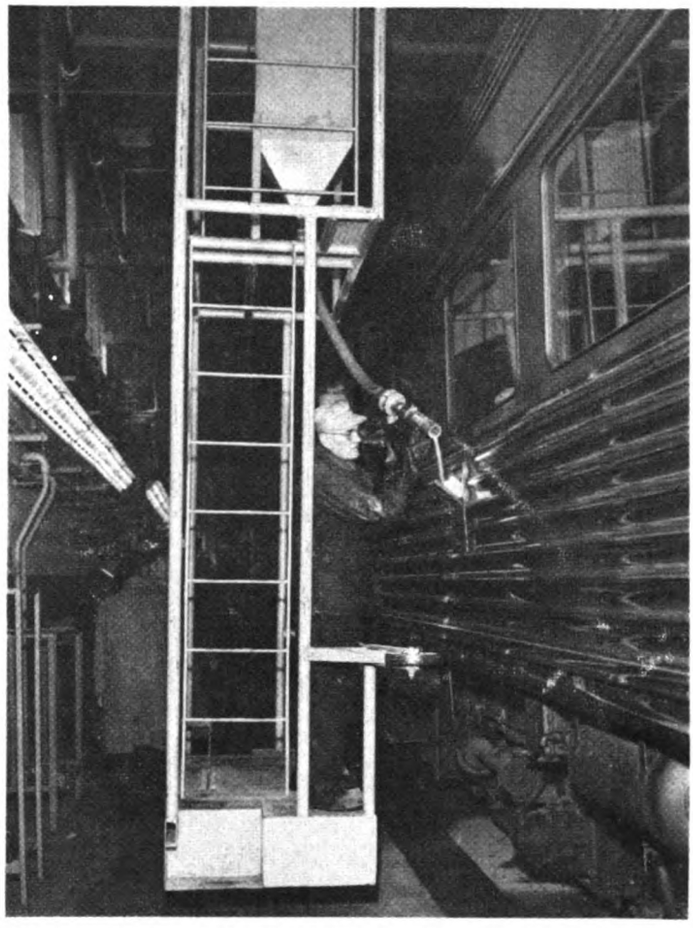
The building is designed to re little maintenance itself. There are miles of radiant heating coils. The ing and ventilating system sup clean, heated air at the rate that fouled with engine exhaust is discha There is sprinkler fire protection.



Designed specifically for two-stop handling of four-car trains, this 720-ft shop is presently servicing trains of up to seven cars. Congested location would made longer shop impractical. Cars enter from left on either shop track. They make fueling stop, then inspection stop. Outside the shop they double through washer. Overall shop width is 45 ft.

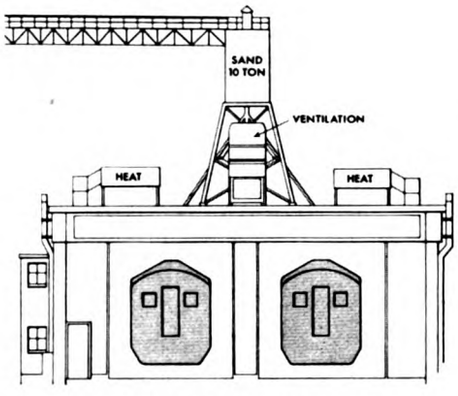


Fueling outlets are spaced to fuel six cars simultaneously. B&M will soon install leak-proof nozzles. All the other 58 oil and water hoses are mounted on automatic reels.

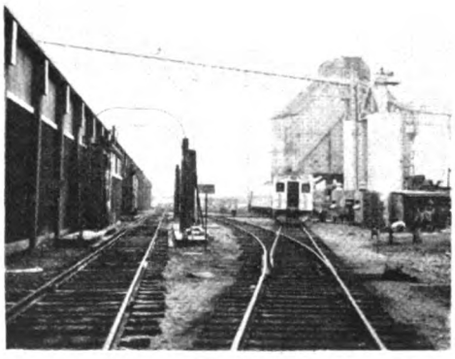


Sanding units are hung from ceiling-mounted monorails on each side of each track. Hopper on each is refilled from 10-ton storage tank at the center of the shop.

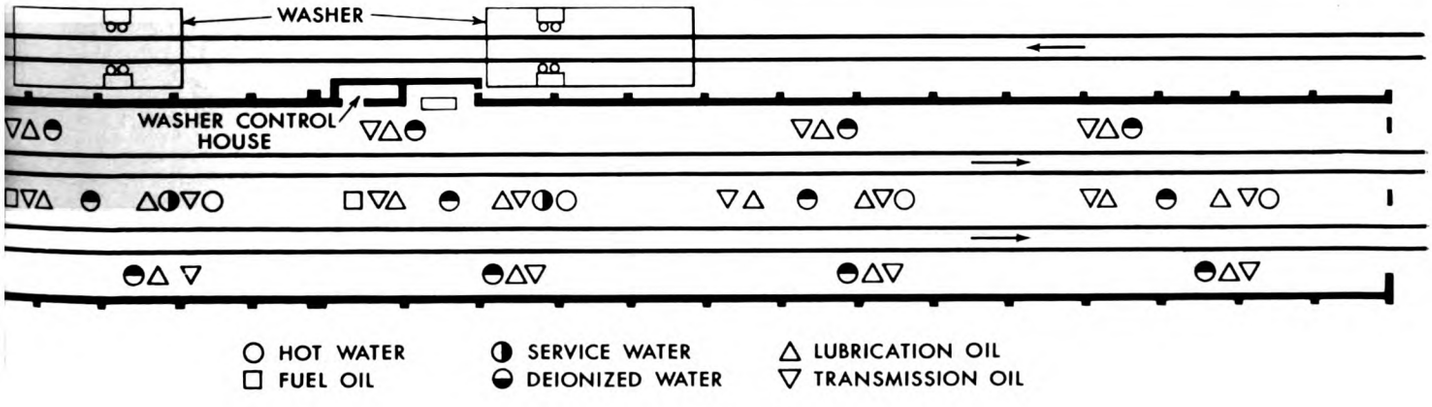
New Budd Building (right) has taken RDC inspection out of diesel shop (left) and cuts down on movements in this crowded engine terminal.



Drains on each side of each track permit washing trucks to remove snow. Tracks are on 19-ft centers and clear height is 18 ft.



Car washer is controlled from elevated booth on side of new shop. Complete new Ross & White sand drying and delivery plant was installed.



Pennsylvania Checks Its Lube Oil

PART II

Lubricating oil in a diesel engine has three functions; PRR laboratory tests assure its performance.

Lubricating oil in diesel engines does three jobs. Its primary function is to lubricate sliding parts so there can be relative motion without siezing and with as little wear as possible. A second function is the cooling of engine parts which can not be directly water cooled. Pistons are the principal components which are cooled with the lubricating oil. Finally, the lube oil should keep the interior of the engine clean. This is particularly important in preventing the formation of lacquer and carbon deposits on pistons and in ring grooves which can cause piston rings to stick. Also sludge must not be allowed to build up in oil ports and passages which could reduce the flow of lubricating oil to a point below that required for satisfactory lubrication.

The semimonthly oil samples forwarded to the test department laboratory from each Pennsylvania road and road-switcher locomotive are subjected to a series of physical and chemical tests in addition to the spectrographic analysis discussed last month. The physical and chemical tests indicate whether the oil is properly performing its intended functions, and whether there are indications that it will continue to do so without changing the oil or replacing the engine air or lubricating oil filters. Physical and chemical tests attempt to protect the engine by assuring adequate lubrication, cooling, and cleaning of engine components. While spectrographic analysis generally attempts to locate parts which might be breaking down in the engine, the chemical and physical tests attempt to keep lubricating oil in such condition that it and the lube oil system will not be the sources of any engine failures.

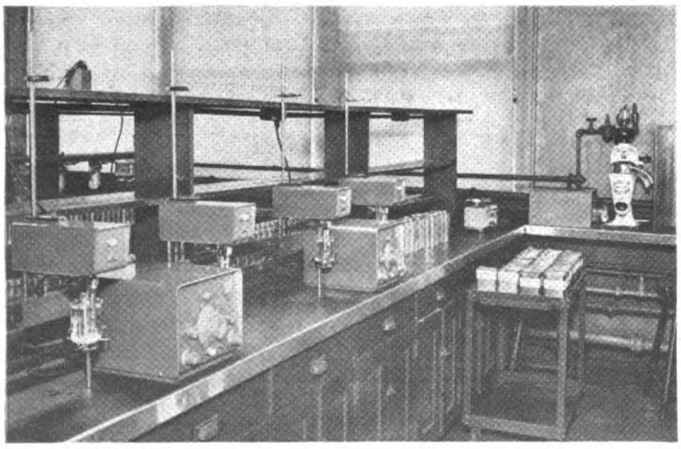
Two major conditions can rob lube oil of its ability to lubricate. These are dilution with fuel oil and dilution with engine cooling water. Fuel oil dilution is determined with two tests—viscosity and flash point. Low viscosity and low flash point are indications of fuel oil in the engine lube oil. If during the flash point test the sample boils while being heated, this is an indication of water in the sample. A visual examination of the oil is a further check on the presence of water. During engine operation the temperature of the lube oil can sometimes evaporate water leaking into the crankcase. This will mean that there will be no free water in the sample. However, the boron water treatment compound cannot be evaporated and remains in the oil as evidence of cooling water leakage. If the boron level in the spectrographic analysis is high, it alone is sufficient indication that cooling water has been getting into the oil system. The boron level in lube oil considered dangerous by the PRR can only result from the leakage of more than 15 gal of cooling water.

Lubricating oil should be able to cool engine parts if sufficient heat is removed by the lube oil coolers and if sufficient volume of oil is supplied. The diesel engine oil systems were designed to perform this cooling function. If the oil is not being cooled properly, or if it is not being circulated in adequate quantities, it will become overheated. Overheating causes permanent changes in the oil. Most of these lubricants are designed to operate at about 190-deg F and contain inhibitors which prevent serious oxidation when this temperature is not exceeded.

If the oil cooler is dirty, or if it is being by-passed, excessive temperatures can develop in the oil. If a piston is not receiving an adequate volume of oil, the lubricant which does reach it will become overheated. If an oil is heated well above its normal operating temperature, the tendency to oxidize will be greatly increased. The oxidation products cause lacquer deposits on pistons and in ring grooves. These products are acid in nature. When they combine with water (which can come from water leaks or normal condensation), strong acids are formed which can attack all the parts of the engine they contact, particularly the lead in the copper-lead layer of tri-metal bearings.

One of the laboratory tests is the double extraction with pentane. A nine-to-one pentane to oil mixture is centrifuged, and the precipitated residue is again subjected to this same treatment. The final insoluble residue consists of dirt and oxidized oil—good lubricating oil is soluble in pentane. If the residue amounts to more than 1 per cent of

(Continued on page 7



ADDITIVES

Electrometric titrometers measure the acidity or alkalinity ("pH") of the oil and indicate condition of its additives. Cart moves samples between the various laboratory operations.

VISCOSITY

Viscosimeters of two types are available. Indications of fuel dilution come from high-production kinematic viscosimeters at left or from slow Saybolt type in foreground.

FROM ENGINE

LUBE OIL SAMPLE FOR SPECTROGRAPHIC ANALYSIS

1. [X] a. Sample from No. — engine of class EF15A loco., unit No. 9801A
   [ ] b. Sample from No. ___ lube oil storage tank.
   [ ] c. Sample from drum.

   Instructions: Mark X in proper square to indicate source of sample. If source of sample is covered by "b" or "c" indicate below company and brand of oil last added to storage tank or company and brand of oil in drum.
   Company _____ Brand _____

2. Date sample was taken 6-19

Fill in following items only when sample is taken from an engine crankcase, as covered by item 1a above.

3. [X] a. Regular periodic sample, or
   [ ] b. Extra sample due to engine failure or other unusual occurrence.

4. Date lube oil last changed: 7-19

5. Reason for last lube oil change: [ ] Regular mileage charge.
   [ ] Periodic engine maintenance.
   [ ] Dilution.
   [X] Other (Explain under Remarks).

6. Loco. mileage since last lube oil change 14997

7. Date lube oil filters last changed: 8-8

8. Loco. mileage since last lube oil filter change 4694

9. Date last monthly inspection: 7-19

10. Remarks: Oil changed on instructions of Test Dept. letter of 7-14

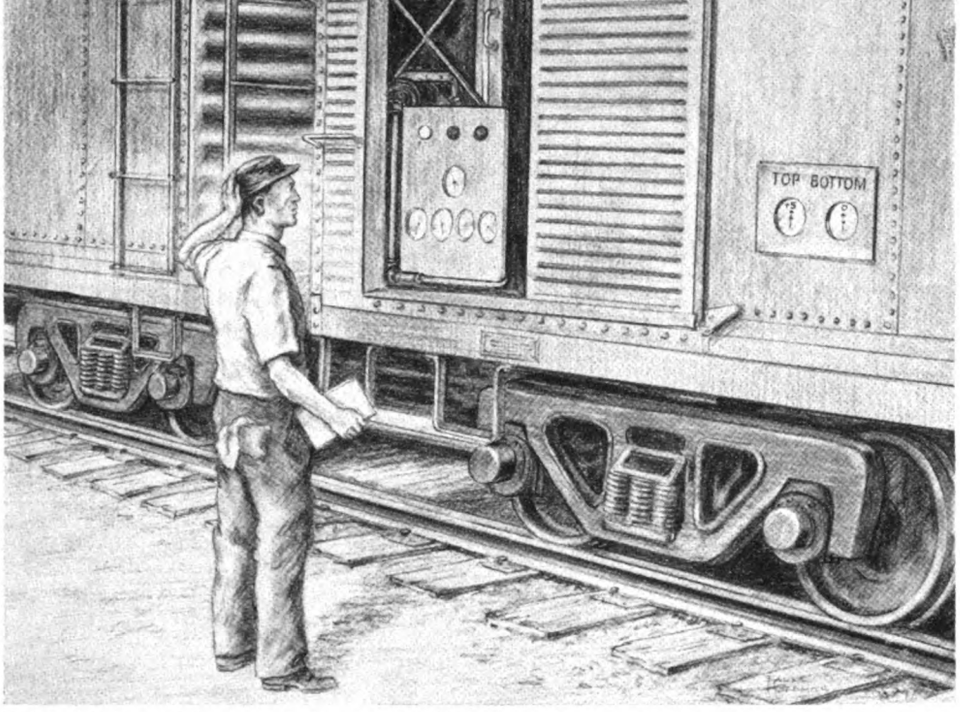
Signature C. A. Minster
Foreman,
Enola Enginehouse.

TO LABORATORY RECORD

No. 1A ENOLA

D-E LOCO. LUB. RECORD Engine Ser. No. 6063 Class EF15A Loco. No. 9801A

| | | |



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by Ken Wright

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"But, Boss," said Pete, "I don't know anything about those cars!"

"Now look, Pete," replied Big Jim, "all of them are loaded with stuff worth thousands of dollars. This load must be protected. You're a good mechanic. You know how to use your head as well as your hands. There is an instruction book and a wiring diagram inside the car. Knowing you, I'll bet you won't need them. You know diesel engines and you know a little about refrigeration. Go on out and fix that car. If you really get stuck, call me and we'll figure out what to do." Big Jim then told Pete where to find the car and its number, and Pete was on his way.

Pete had seen some of these cars going through in trains but had never had a real close look at one. He did know that they had a thermometer on them some place to tell the car's inside temperature. He also had heard that they carried a log book. "No one is ever able to tell you more than 'not working right,'" Pete mumbled to himself as he approached the car, 25 minutes after the trouble was reported. Methodical Pete looked it over to find the temperature gage and locate other parts of the equipment. The temperature gage was a dual unit that read zero on the dial marked *Bottom* and five above on the one marked *Top*. Pete noticed that the diesel engine was running and wondered why anyone would worry with temperatures that low. In looking the car over he had noticed a small door marked *Log Book* and decided to see what temperature should be maintained.

"Why didn't Big Jim tell me these doors were sealed?" Pete grumbled. "Well, only one thing to do—break the seal, but I'll save it till I can write the number down."

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SP Is in the Chips

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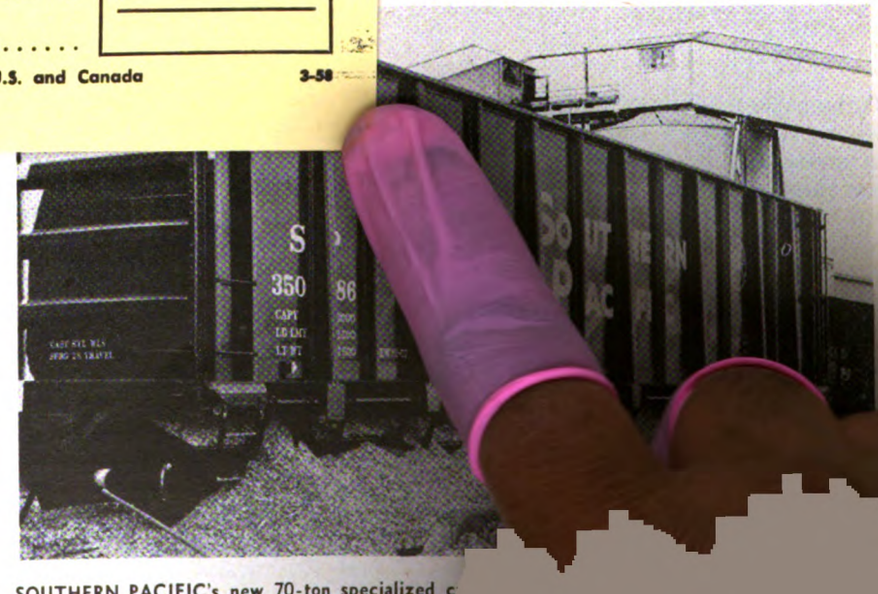

SOUTHERN PACIFIC's new 70-ton specialized c
of fourth side panel from left are for attaching

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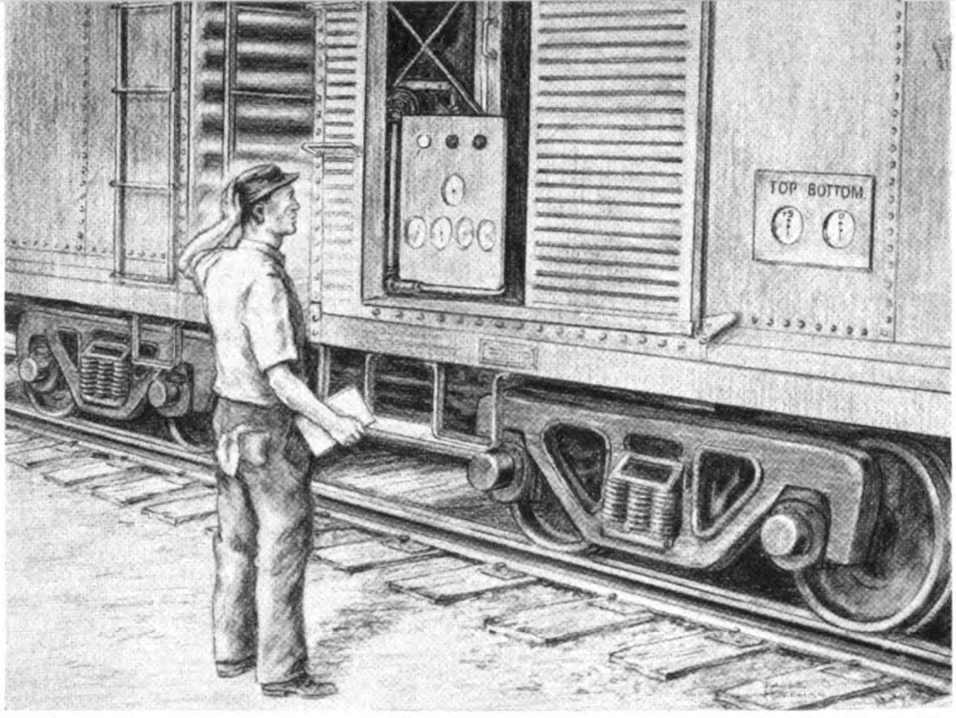

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While waiting, he kept thinking about the pilot lights on that first panel. One of them was marked *Defrost.* Why wouldn't it be burning if the car was defrosting? Pete crawled out of the car to look at it again. It had a red lens and the sun was shining brightly on the panel, but certainly the light wasn't burning. Unscrewing the lens, he noticed the bulb, itself, was quite black. He removed the bulb; the filament was broken.

Pete was just ready to put the lens back on without the bulb when he noticed something taped to a large cable at the left of the panel. Looking closer, he saw it was a set of three spare bulbs. Pete put one in the Defrost socket and it lighted. Almost immediately it went out. At the same time, however, Pete noticed a different sound from the diesel engine. He quickly replaced the red lens and got back up into the car. Glancing down, he saw the compressor was running. On the control panel, the H contactor was out, the 2MS contactor was in, and the timer was reset to 45 min. The timer's defrost cycle had come to an end just after he installed the new bulb.

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SP Is in the Chips

Almost 400 wood chip cars of an order for 500 have been delivered to the Southern Pacific by the General American Transportation Corporation. They are hauling chips from lumber and plywood mills to hardboard and paper plants. The cars were designed by C. C. Leriche, supervisor of car loading and construction for the SP, after a study of the problems involved in transporting this product.

These drop-bottom steel cars have a capacity of nearly 4,600 cu ft. Inside, they are 3 in. wider at the bottom than at the top, which speeds unloading and keeps chips from sticking. The drop doors, hinged at the center line and operated by ratchets, are similar to those used on conventional drop-bottom gondolas. There are ladders inside the car to facilitate inspection.

Inside, the cars are 52 ft 11 in. long, 10 ft high, and 8 ft 10 in. wide at the bottom. The extreme outside width is 10 ft 6 in., and the length over coupler faces is 58 ft 2 in.

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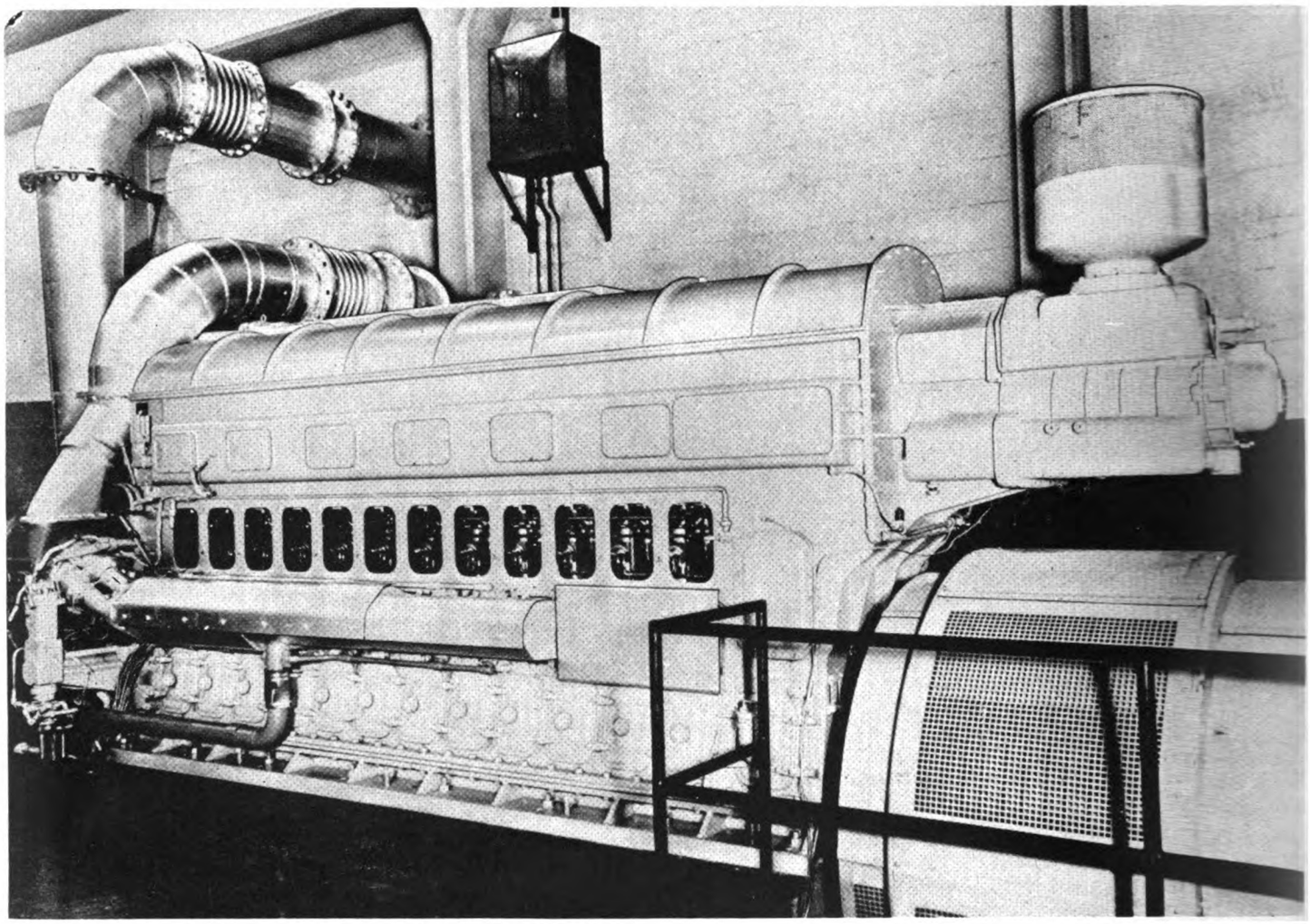
SOUTHERN PACIFIC's new 70-ton specialized car for wood-chip loading. Small holes at base of fourth side panel from left are for attaching portable vibrator to loosen lading.



THIS 12-CYLINDER turbo-supercharged opposed-piston Fairbanks-Morse diesel is rated at 3,600 hp at 900 rpm with a weight of only 12.8 lb per hp.

Fairbanks, Morse Does It . . .

Two-Cycle O-P Engine Is Supercharged

Turbo-supercharging of its two-cycle, opposed-piston diesel engine has just been announced by Fairbanks, Morse. Supercharging adds up to 50 per cent of the output of this diesel, making it available in ratings up to 3,600 hp. An added dividend achieved by the turbocharged opposed-piston engine is a 5 to 10 per cent saving in fuel consumption. F-M engineers predict that this diesel will be used in stationary power plants, locomotives, and mobile power plants.

Turbocharging is available in the 6-cylinder and 12-cylinder 8⅛ x 10-in. opposed-piston engines. The weight of the 6-cylinder basic engine is approximately 24,900 lb, only 2,000 lb more than the non-supercharged engine. The weight of the 12-cylinder unit is approximately 46,200 lb.

At its top rating of 3,600 hp at 900 rpm, the 12-cylinder diesel weighs only 12.8 lb per hp. Recommended speeds will vary, of course, with the application. It is expected that most locomotive applications will operate at 850 rpm.

Fits Same Space

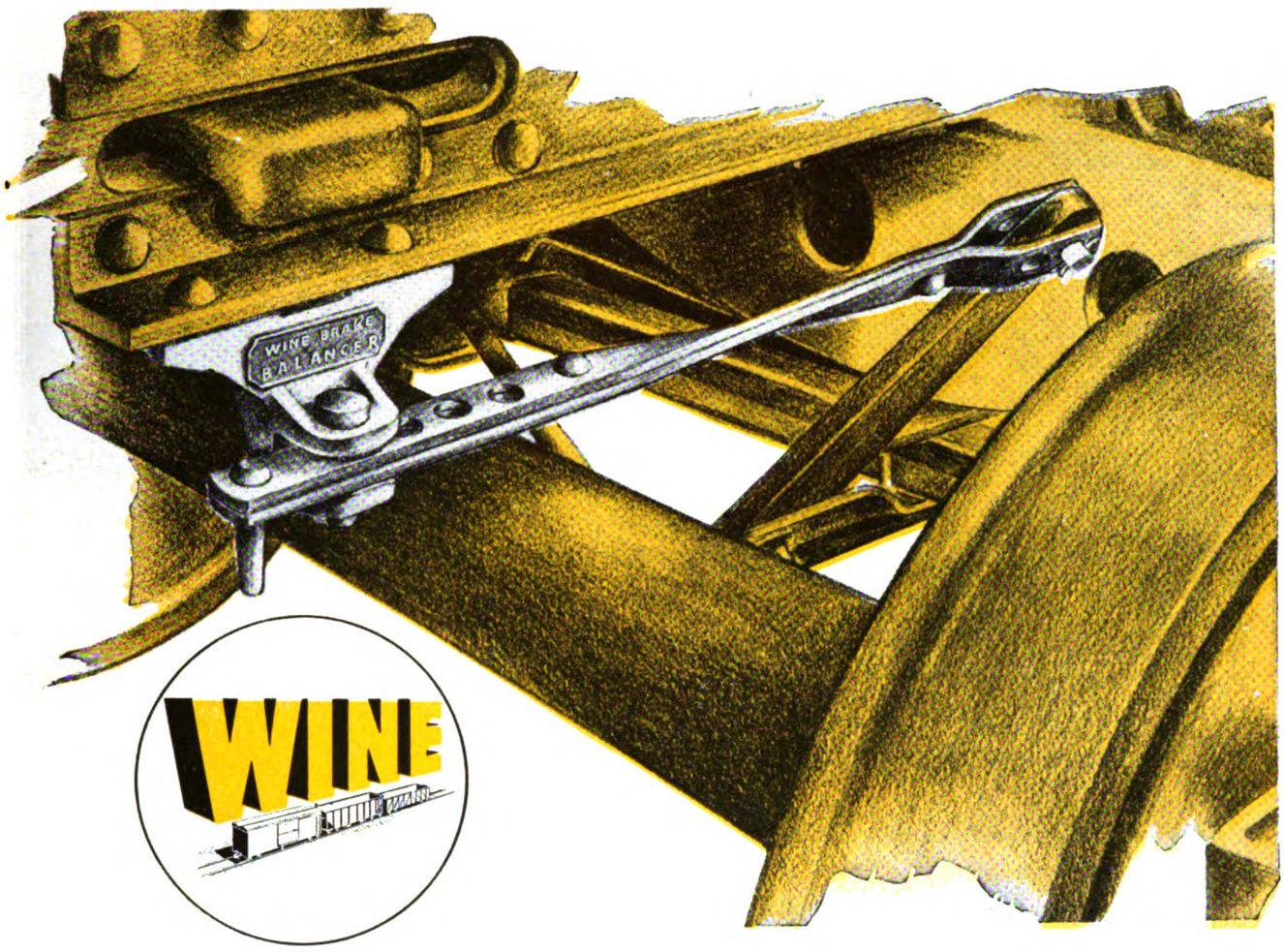
Space required for installation of the supercharged engine is virtually the same as for the non-supercharged unit since the turbochargers are mounted on the end of the engine and extend little beyond normal piping connections below. For railroad application, it means more power and train speed with a single locomotive.

Another factor of importance in many railroad installations is the greater power available at high altitudes. Supercharged engines are less sensitive to atmospheric pressure.

The turbocharged O-P engine has been under development since 1945, with continuous concentrated effort since 1952. It is difficult to provide sufficient scavenging air for a two-cycle engine with an exhaust-driven turbocharger alone. The importance of developing a substantially self-sustaining turbocharged system was recognized by F-M because it provides for better fuel consumption and lower first cost. Improvements in turbocharger efficiency, matching of the turbocharger, and utilization of pulse energy have permitted the development of a substantially self-

(Continued on page 42A)

EQUALIZE BRAKE FORCES..



BRAKE BALANCERS

Eliminate truck distortion . . Greatly reduce maintenance . .

Development of the Wine Brake Balancer has proved the solution to unbalanced braking forces that develop with the conventional truck brake arrangement.

The Wine Brake Balancer replaces the standard dead lever connector and eliminates the necessity of the dead lever connector bracket on the truck bolster

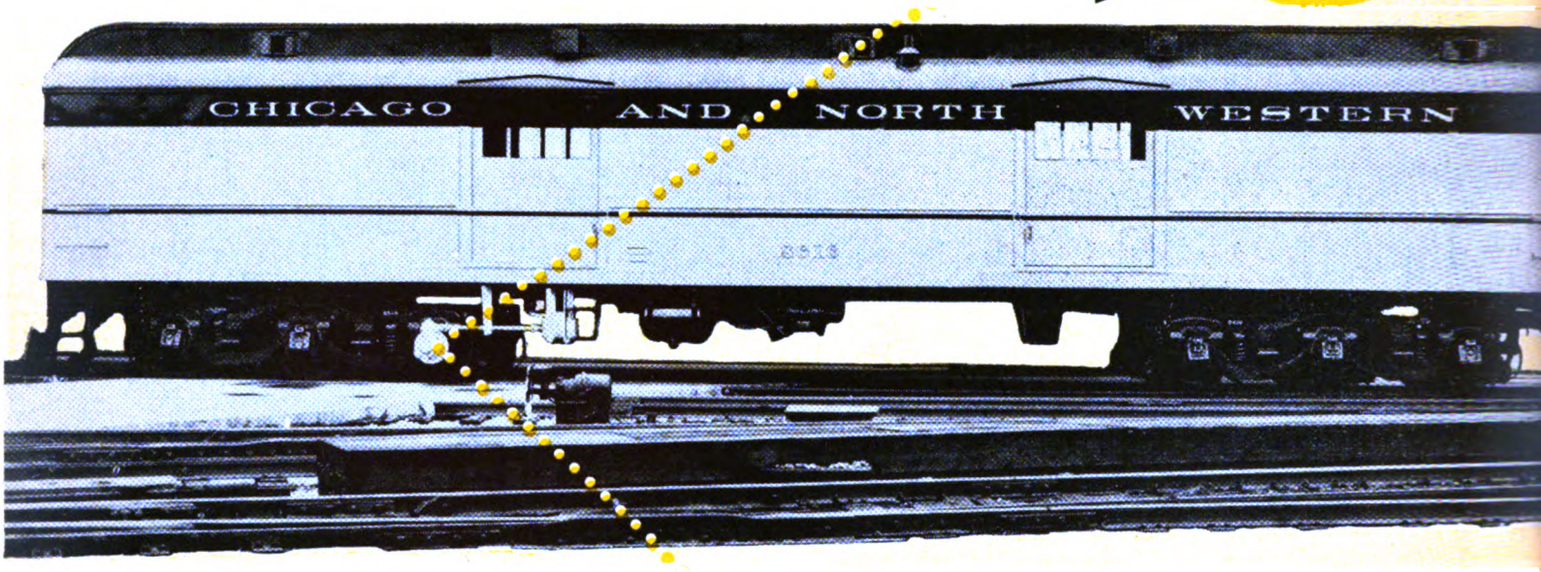
Instead, the Wine Brake Balancer has brackets secured to the center sill flange at each end of the car, and connectors extend from these brackets to the dead levers on the truck. This arrangement "balances" the brake forces by returning them to the underframe of the car This simple, yet rugged design meets all service requirements on any capacity car Write for complete details

THE WINE RAILWAY APPLIANCE CO., TOLEDO 9, OHIO

Chicago and Northwestern uses the Spicer Model 2½ to 5KW

POSITIVE GENERATOR DRIVE

CHICAGO AND NORTH WESTERN RAILWAY



. . . . the smallest, lightest and lowest-priced positive drive for railway generators!

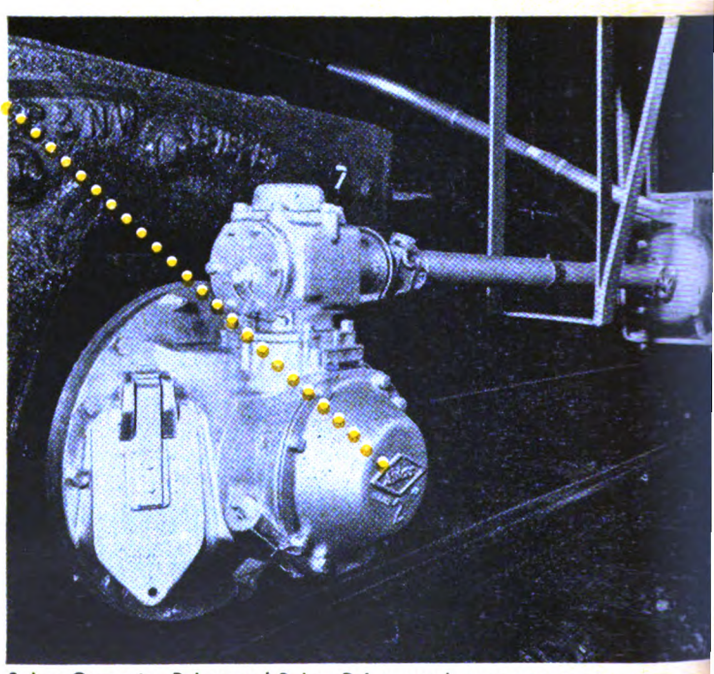
The Model 2 and Model 2-1 Spicer End-of-Axle Drives have been developed for generators up to 5 KW capacity on caboose, cabin, mail, baggage and refrigerator cars.

These drives can be installed either horizontally or vertically, especially meeting the requirements of cabooses and head end cars where minimum maintenance and low operating costs are imperative.

The Model 2 is used on all axles with friction bearings, and on roller bearings where it is not permissable to go through the bearing end cap. It is available for all horizontal and vertical applications in ratios of 1.76 to 1; 2.47 to 1; 3.70 to 1; 5.28 to 1; and 7.55 to 1 (this ratio not available for vertical application).

Model 2-1 is used on roller bearing axles where it is permissable to go through the bearing end cap. It is available in ratios of 1.76 to 1; 2.47 to 1; 3.70 to 1; and 5.28 to 1. Both models are self-contained units employing spiral bevel gears with all wearing parts running in a constant bath of oil.

Ask Dana engineers to help adapt the Spicer Generator Drive to your particular new and old car requirements.



Spicer Generator Drives and Spicer Drives are in use on over 14,000 cars for over 80 railways.

DANA

Spicer

DANA CORPORATION • Toledo 1, Ohio

DANA PRODUCTS Serve Many Fields:

AUTOMOTIVE: Transmissions, Universal Joints, Propeller Shafts, Axles, Powr-Lok Differentials, Torque Converters, Gear Boxes, Power Take-Offs, Power Take-Off Joints, Clutches, Frames, Forgings, Stampings.

INDUSTRIAL VEHICLES AND EQUIPMENT: Transmissions, Universal Joints, Propeller Shafts, Axles, Gear Boxes, Clutches, Forgings, Stampings.

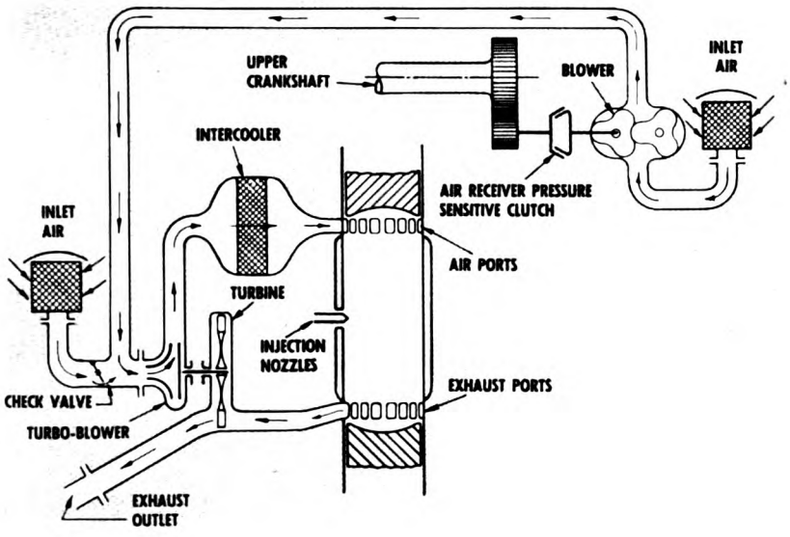
AVIATION: Universal Joints, Propeller Shafts, Axles, Gears, Forgings, Stampings.

RAILROAD: Transmissions, Universal Joints, Propeller Shafts, Generator Drives, Rail Car Drives, Pressed Steel Parts Traction Motor Drives, Forgings, Stampings.

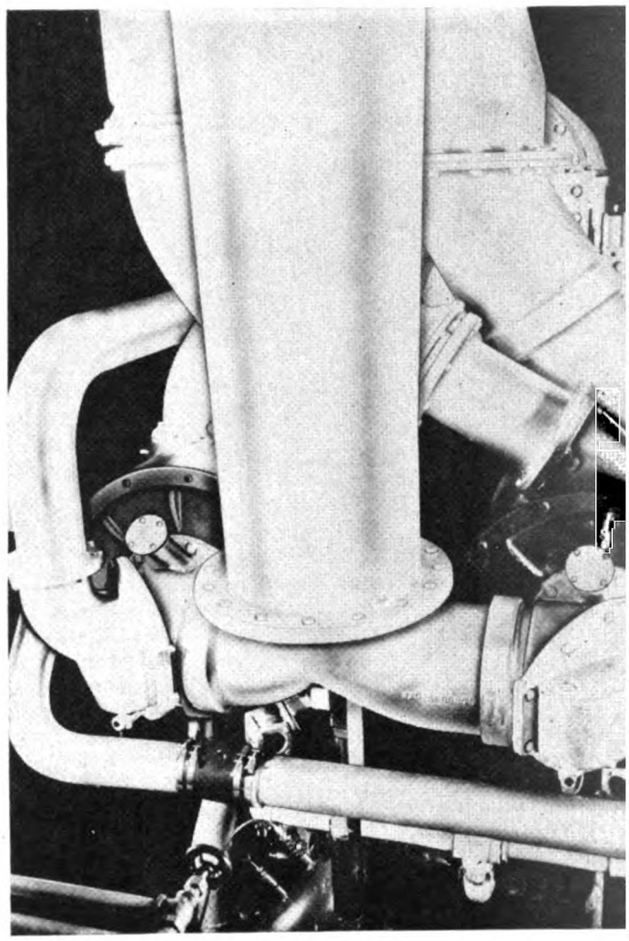
AGRICULTURE: Universal Joints, Propeller Shafts, Axles, Power Take-Offs, Power Take-Off Joints, Clutches, Forgings, Stampings.

MARINE: Universal Joints, Propeller Shafts, Gear Boxes, Forgings, Stampings.

Many of these products manufactured in Canada by Hayes Steel Products Limited, Merritton, Ontario



EXHAUST GAS and scavenging air-flow diagram for the Fairbanks-Morse turbo-supercharged, opposed-piston diesels shows scavenging blower for low-load operation.



EXHAUST GASES drive a pair of gas turbines on this 12-cylinder F-M turbo-supercharged opposed-piston diesel.

(*Continued from page 42*)

sustaining turbocharger system.

In the 12-cylinder engine, cylinders 1, 2 and 3 exhaust into one manifold group. Numbers 4, 5 and 6 exhaust into a second manifold group, numbers 7, 8 and 9 exhaust into a third, and numbers 10, 11 and 12 into a fourth group. The firing order is adjusted so that exhaust pulses in the same exhaust follow each other at 120 deg intervals.

Packing a heavy charge of cool air into the cylinders, F-M engineers have been able to raise BMEP 50 per cent to 129 psi, allowing a rating up to 300 hp per cylinder. At the same time, firing pressure has been held to 1,350 psi. Only cylinders, pistons, engine-driven blower and the exhaust system differ in the two types of engines. Cylinder block, connecting rods, crankshafts, pumps, gears, camshafts and bearings are interchangeable. It has been established that at the 50 per cent higher output, the oil and water-cooling requirements show almost no increase.

Improved fuel consumption is a major advantage of the turbocharged O-P. Actually, the specific fuel consumption is from 5 to 10 per cent lower at full load operation and a great deal lower at part load operation as compared to the non-supercharged engine.

The testing program for the supercharged diesel has involved 20,000 hr of engine operation.

In the supercharged O-P, the exhaust gases flow from the exhaust ports by way of divided manifolds through the gas-turbine section of the turbocharger. The turbocharger blower compresses atmospheric air to the required air receiver pressure. The scavenging air is cooled on its way from the turbocharger blower to the air receiver.

Automatic Control

Through virtually all the normal operating range of the engine—from about one-third load up to overload—the exhaust energy recovered in the turbine is sufficient to supply an adequate quantity of scavenging air. Only below one-third load is it necessary to supplement the air supply with an engine-driven blower. From the time the engine is started and gets up to approximately 40 per cent load, the supplementary blower supplies scavenging air to the engine. At this point it is automatically disengaged by means of a heavy-duty tool-machine-type clutch. It remains at standstill at all higher loads and is only reengaged if the engine load should drop below approximately 30 per cent. The controlling element for engaging and disengaging the clutch is in the air receiver pressure. During starting when there is no air receiver pressure, the clutch is positively engaged and a supply of combustion air is available from the blower.

The auxiliary blower discharges into the suction of the turbocharger blower. A check valve prevents loss of this air to the atmosphere. This check valve automatically opens when the turbocharger blower begins pumping more air than is supplied by the auxiliary blower. The entire amount of air passes through an air cooler which is located on the engine above the air receiver.

The ability of the engine to operate for the most part without the blower can be traced, in part, to the utilization of exhaust pulse energy in the turbocharger. During the early part of the exhaust process when the gases enter the exhaust manifolds, a pulse is created by the blow-down energy. This pulse can exit only through the rotor of the turbocharger creating an additional driving force.

In order to prevent this pulse from entering other cylinders through open exhaust ports, the exhaust manifolds have been divided in units for each three cylinders. In the three cylinders there is no valve overlap.

For the THIRD consecutive time
...on its order of GP-9's

Illinois Central again equips diesels with Air-Maze oil bath filters

The reason is simple... longer wear from cylinder liners, pistons and rings; less cost for fewer repair parts and fewer maintenance manhours.

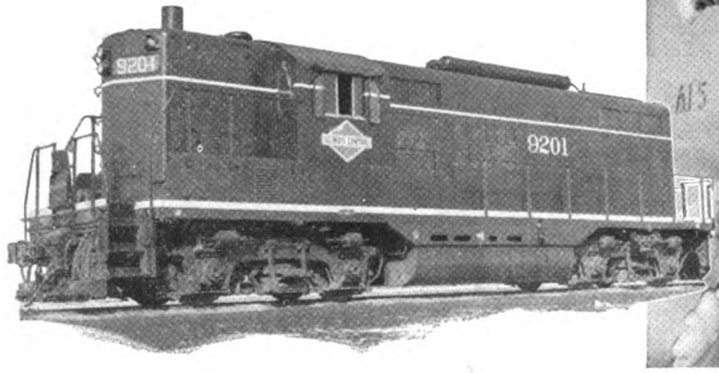
This is the record *after two years' testing* of oil bath filters on switchers, road switchers, and passenger locomotives.

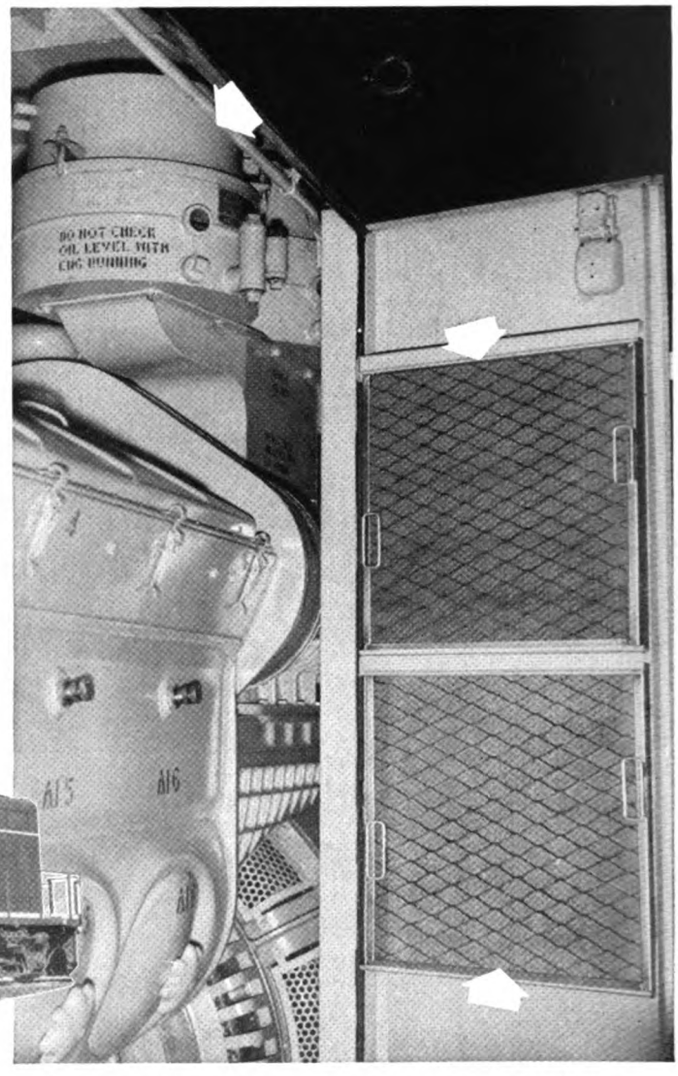
And this is the reason why the third fleet of 70 diesels, like the first and second fleets . . . 367,500 horsepower in all . . . is completely protected with Air-Maze oil bath filters.

Actually 59% more fine dust is removed by Air-Maze oil bath filters than the next best railroad filtering device. And by filtering the air in a bath of oil, high filtering efficiency of the oil bath filter is maintained even at lowest engine speeds.

What's more, the oil bath filter operates 3 months or longer with minimum maintenance.

For information write your locomotive builder, or Air-Maze Corporation, Cleveland 28, Ohio. Dept. RL-3.





Oil bath filters *(upper left) maintains 92% efficiency or better in cleaning intake air in a bath of oil.*

P5RR car body filter panels *(upper right) also used on this railroad to pre-filter air going to engine, traction motors, compressor, and generator.*

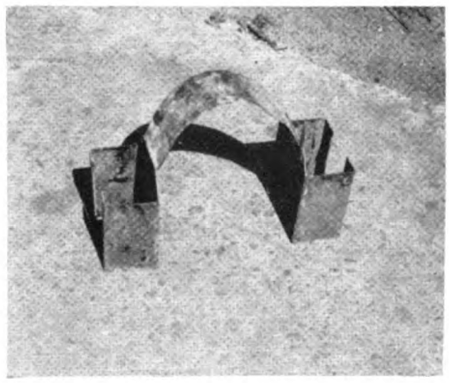
AIR-MAZE
The Filter Engineers

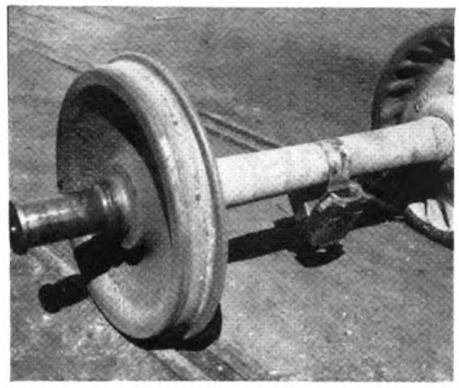
GEARED TO PROGRESS
P R I
MEMBER

ENGINE AIR FILTERS • CAR BODY FILTERS • LUBE OIL FILTERS • PASSENGER CAR FILTERS

Fruit Growers' Fitted Journal-Brass Carrier

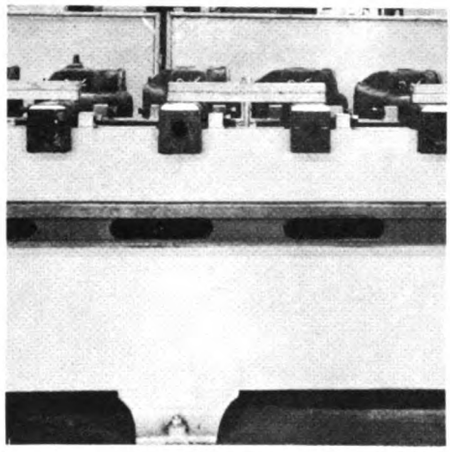
Sling for carrying journal brasses makes it possible to keep fitted bearings with the wheel set for which they were machined. Jacksonville, Fla., shop of Fruit Growers Express developed these inexpensive carriers to use in conjunction with an Ajax-Consolidated brass trimmer.

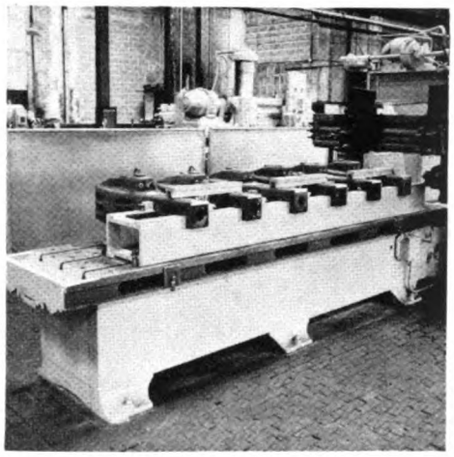




Western Maryland's Coupler-Butt Planing Jig

Coupler Butt Planing Jig at the Hagerstown, Md., shop of the Western Maryland makes possible simultaneous machining of six couplers and has increased production. Jig, bolted to the bed of planer, has three locating screws along each of the slots for a coupler shank. These screws make it possible to square the coupler very exactly prior to machining. Couplers go through this process after the butts have been built up by welding.



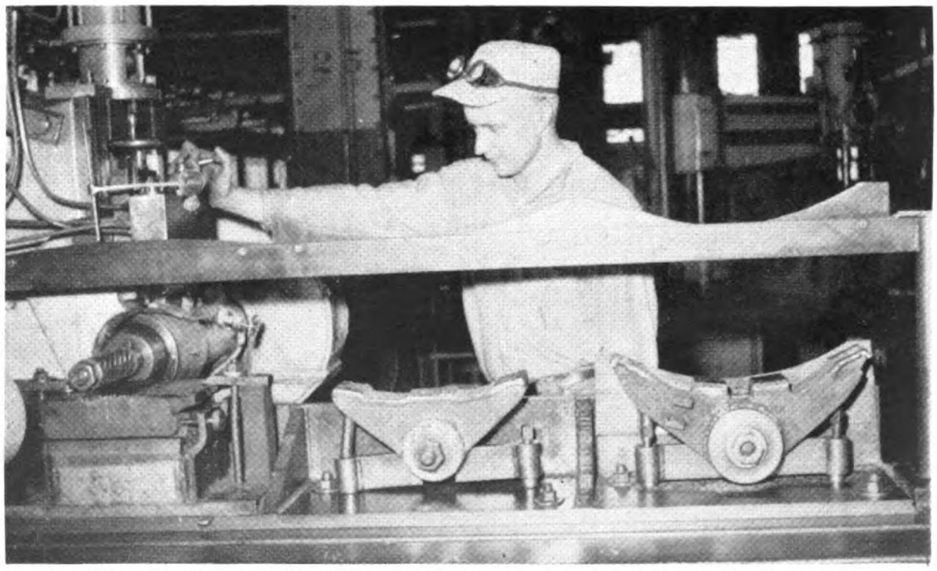


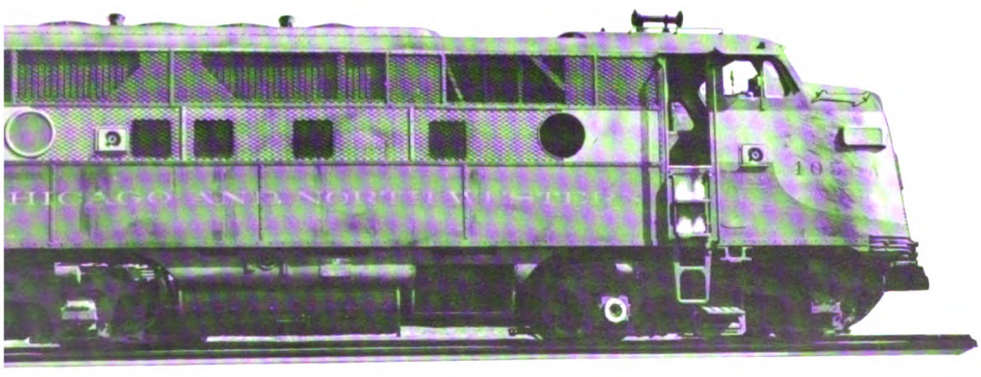
Burlington's Wedge and Brake-Head Reclamation

A slab milling machine in the West Burlington, Iowa, shop of the Chicago, Burlington & Quincy has been adapted to the milling of journal box wedges and brake shoe heads.

Worn journal box wedges and brake heads are first built up by welding with Shurweld-N rods. They are then set up on the milling machine. The height of the milling cutter head is controlled by hydraulic cylinders so that the cutter will follow the contour of a profiling cam above the work.

The convex cam at the left guides the cutter for a journal box wedge as the work on the table is moved under the cutter. The two concave cams to the right control the cutter for machining two brake shoe heads. This application was developed at the Burlington shop.





Working on a planned *program covering ten months, the North Western turned in and received each month three to four locomotives, thus minimizing out of service time. At left is one ten-year-old freight unit as it was turned in to Electro-Motive. Above is one of the new General Purpose units at work.*

New locomotives for old . . .

The Chicago and North Western Railroad has turned in thirty-two F3 freight locomotives on the purchase of thirty-two new General Purpose locomotives containing certain remanufactured parts.

The value of the old freight units (worth nearly 40% of their original cost) was applied against the purchase of the General Purpose locomotives that embody all the improvements in materials and design of the past ten years.

This is the second phase of the North Western's *power renewal plan.* The first involved their oldest model (FT) freight locomotives.

How this or similar plans might benefit your roads' future can be had in detail from your Electro-Motive representative.

GENERAL MOTORS LOCOMOTIVES

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS

LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*

In Canada: General Motors Diesel Limited, London, Ontario

Advances Made In D-C Hi-Potting

Oscilloscope produces ionization patterns which occur just below insulation breakdown voltage and indicate causes of low insulation resistance

THE VALUE OF HIGH-VOLTAGE, d-c testing of electrical insulation on diesel-electric locomotives has recently been greatly increased. It has been determined that as the test voltage is increased in steps, ionization occurs at a voltage value just below that which might cause breakdown of the insulation. This ionization may be detected as noise or as a visible oscillation on an oscilloscope. The oscilloscope oscillations are characteristic of insulation conditions and indicate "dry and clean", "dry and bad", "wet" and "very wet" insulation.

Specific data on these developments is contained in a paper presented at the Winter General Meeting of the American Institute of Electrical Engineers held in New York, February 3-7, 1958. The paper, entitled "Improved D-C High-Potential Testing of Insulation Systems in Low and Medium Voltage D-C Equipment", was presented by A. M. Odok and T. M. Soelaiman, both of the Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

The following is a synopsis of the paper.

Elimination of unexpected breakdowns in d-c high-potential testing is made possible by observing the electrical noise caused by ionization. The relative severity of ionization discharges is easily detected by picking up a voltage drop proportional to the current in the test circuit. The high frequency discharges can then be observed on an oscilloscope screen or measured by other means. It is found that:

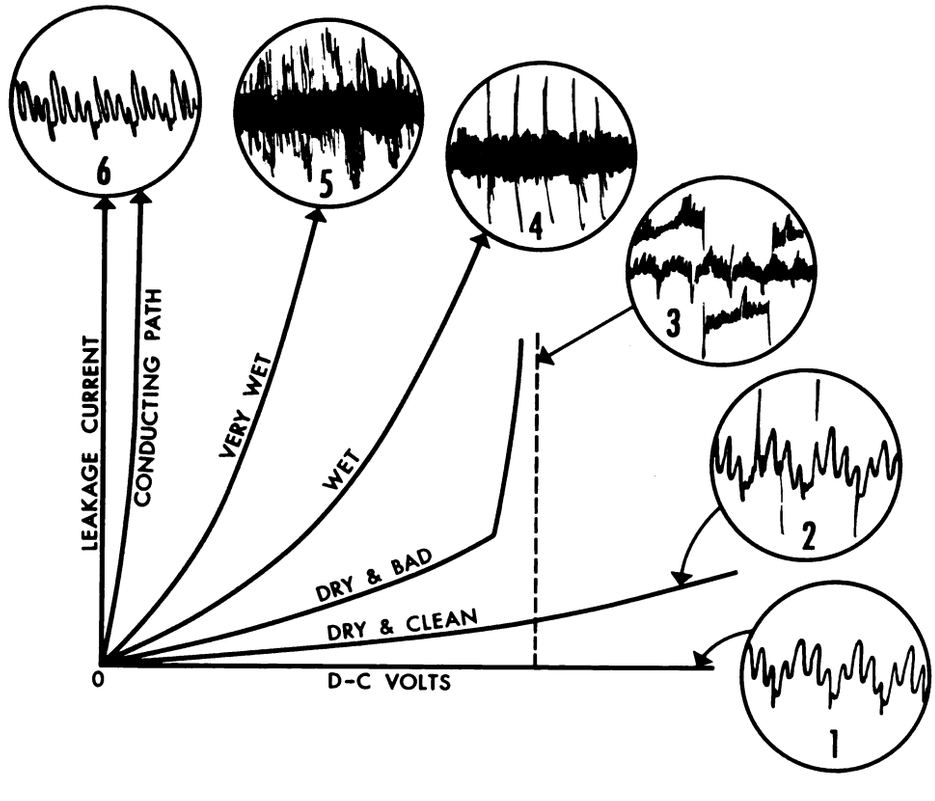
1. D-c high-potential tests are nondestructive if they are stopped at the voltage value at which any appreciable amount of ionization is observed, because breakdown is always preceded by ionization discharges in the insulation system.

2. The noise pattern on the oscilloscope screen is different for different conditions of insulation. This, in conjunction with the leakage and absorption current characteristics, enables one to tell whether the insulation is dry or wet, clean or dirty.

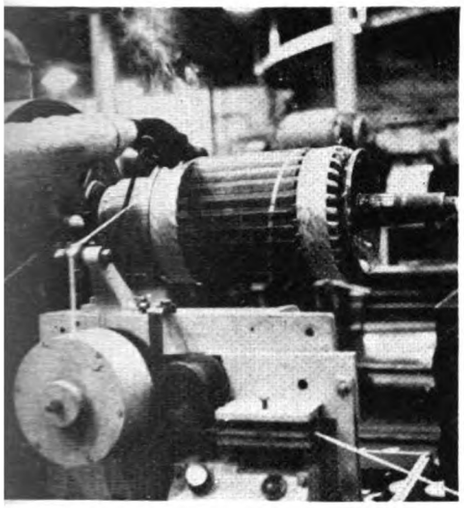
Tests have been made on small laboratory samples of insulation; on components of railroad equipment, such as armatures and field windings; and on entire locomotive power circuits. A great number of tests were carried out without any unanticipated breakdowns occurring.

A quantitative analysis of the ionization discharges with respect to magnitude, power and frequency spectrum may supply additional valuable information about insulation condition. This aspect presents a promising field for further investigation.

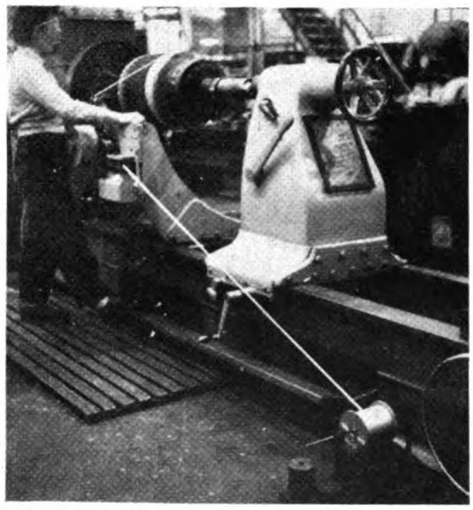
It is suggested that a similar approach be investigated for use during a-c high-potential tests.



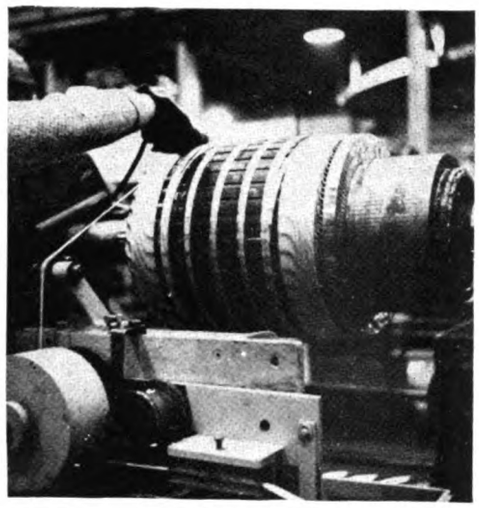
Typical oscilloscope patterns for various conditions of insulation.
1. No discharges
2. Occasional discharges
3. Broken down
4. Frequent discharges
5. Hazy picture due to very high frequency of discharges
6. Conduction only, no discharges



hot soldering iron seals the end of the tape, ompleting the banding on the armature of a West-ghouse 75-hp motor.



The foot controls the rotation of the armature in the banding machine. The operator positions the cradle for lap-winding the tape.



The finish of a banding operation on a Westinghouse armature for a Porter diesel locomotive. Armature will be reversed for replacing the string band using full width ⅜-in. tape.

J. S. Steel Gets Substantial Savings.....

Glass Banding Armatures

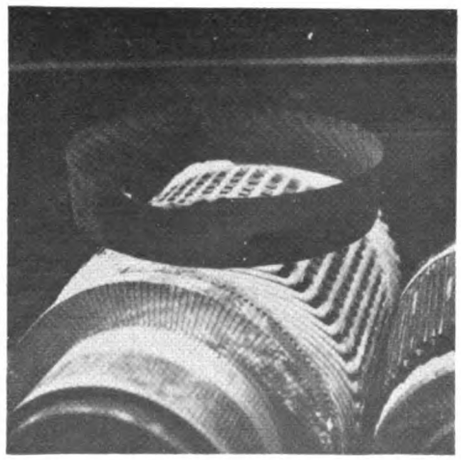
ARMATURE BANDING with polyester on-woven parallel flat glass tapes in he South Works of United States Steel Corporation, South Chicago, Ill., is efinitely not on an experimental basis. tarting two years ago, an average of 00 armatures per year have been anded. Most applications are for crane, able and mill auxiliary drive motors, anging from 10 hp to 300 hp, and ocomotive applications have been de-eloped from these. Company officials ay one of the most important benefits n using tape are the savings made hrough elimination of mica inserts, olding clips, soldering and preparation f true, parallel surfaces required by he previous method.

A Peerless type 11L banding machine aving a shop-made device, which slides n the ways, is used for applying the ape. The reel-mounted tape is located t floor level, and is fed parallel to the nachine through a positioner which eeps it flat. It then goes over a smooth haft, and is directed at right angles hrough a hydraulic tensioner controlled y the operator. The device is portable nd when moved to other locations, the ape is run through on a straight line o the armature.

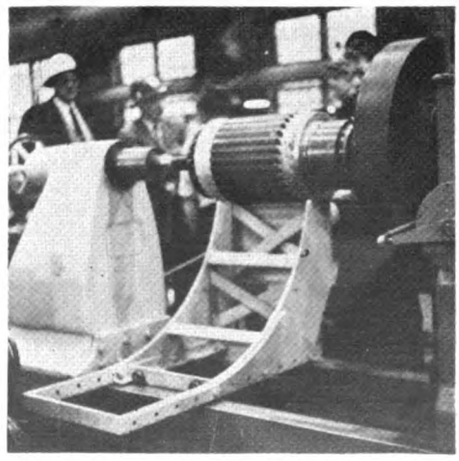
CPS Res-i-glas tape is used, ⅜ in. ide and 0.015 in. thick, made by hicago Printed String Co. Some ¾ in. ape is used, with same thickness. The ape is kept refrigerated at 50 deg F r below prior to use, since it will become partially laminated at higher temperatures if allowed to set.

A tension of 50 lb is used for most applications. Five layers of tape are applied in a slight overlapping manner, and held securely to the underlying layer by smoothing down with a hot solder iron. Ample space for any tape build-up is available, since insulation necessary for steel banding is not required. Total thickness of the band will vary according to the armature diameter, with a maximum of ⅜ in. to ½ in. While this is considerably less than recommended, applications to date have been satisfactory. The tape is then angled across the core section, where the core is taped in three or four locations, about 1 in. wide, depending on length of section. This taping is done to protect the armature coils and core from injury due to rough handling. String banding over the commutator cone has been eliminated, and the full ⅜-in. width tape is used over the mica surface to give a smooth finish, prevent the mica from flaking off and cut down leakage path.

After the taping is finished, which on most armatures requires about 20 min to 30 min, the armature is dipped in Sterling 583 varnish, cold dip, and



Res-i-glas banded laminate had to be cut from a General Electric armature because of flashover burning. Indentations on inner surface were caused by shrinkage of tape in application and curing.



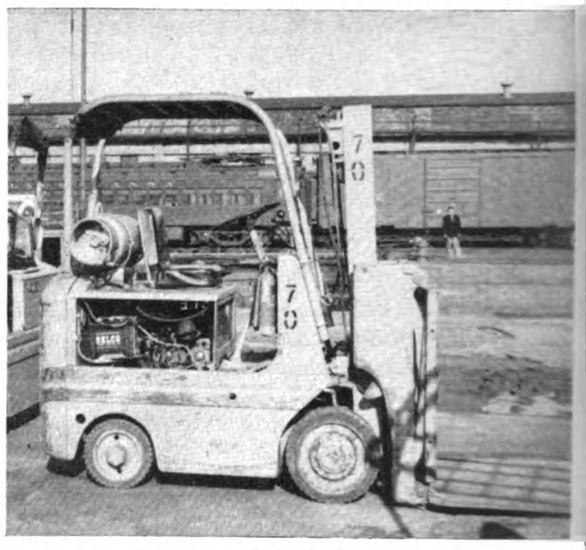
Above: The cradle of the portable banding device slides on the ways of banding machine.

drip dried. It then goes to the baking oven. USS has been experimenting with lower temperatures, a range of 175 deg F for all night curing to 225 deg F for three or four hours, depending on the need for armature. Tape shrinkage of 7 to 10 per cent together with tension in application gives a tight fit, and makes the finished band moisture and dust proof.

An unusual job of taping was done during the past year on a GE 3,000 kw generator, rated speed 375 rpm, with a commutator diameter of 50 in., and length of 51 in. Cracks had developed at the base of the commutator bars at both ends which could lead to the bars raising out of position during operation, and cause considerable damage. The end of the commutator opposite the riser was machined smaller in diameter outside of the brush clearance and banding was applied ½ in. thick and ¾ in. wide. Tension at starting was 150 lb with a finishing tension of 75 lb. Banding was also applied at the center and adjacent to the risers. To cure the banding, 41 lamps, each 150 watts, were located in a concentric ring around commutator, 4 in. from surface. During curing, the armature was revolved about 8 to 10 rpm. Brushes located at the three positions were drilled and thermocouples applied to assure an even temperature and keep it within limits. Using this method of banding extensively has reduced the cost and equipment outage time over previous methods used.

According to the manufacturer, Resi-glas tape is non-magnetic, non-inductive, and has a 120,000 psi rating in a single layer and 140,000 psi in laminate form. The ultimate and yield strength are practically identical. It will stand short term temperatures up to 260 deg C, with a continuous rating of 150 deg C, and is rated well over 400 volts per mil. The laminate is said to have about one-half the creep of previous material, either at rated load or up to ultimate, with the tape having 100 per cent recovery after elongation up to the ultimate.

A group of fork-lift trucks, parked in the Lackawanna's Hoboken, N. Y. yard.



The fuel tank is mounted back of the seat.

Propane Replaces Gasoline

Delaware, Lackawanna & Western reduces fuel and maintenance costs by converting engine-driven yard equipment from gasoline to compressed gas fuel. Gas is best for intermittent operation.

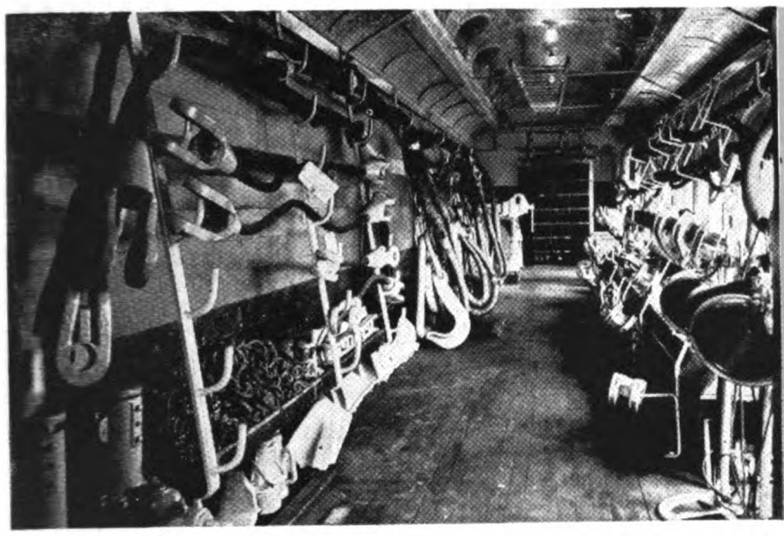
LIQUEFIED PETROLEUM gas has replaced gasoline for operating yard trucks and cranes in the Lackawanna's Hoboken, N. J. terminal. Overall fuel costs for the fleet of equipment have been reduced about 40 per cent. Actually the cost of the compressed gas based on Btu per gallon is somewhat higher in the eastern states than it is for gasoline. The saving is effected because the intermittent operation and extended idling periods required by the engines in this service necessitate the use of an over-rich mixture for gasoline operation.

Longer engine life and lower maintenance is obtained because the compressed gas enters the engine combustion chamber as a gas rather than a vaporized liquid. This insures almost perfect combustion with no residue. The result is that engines run four times as long between overhauls.

The gas does not dilute the lubricating oil. This reduces engine wear and extends periods between oil changes four or five times.

Another advantage of the use of compressed gas is the reduction of objectionable exhaust fumes. Carbon monoxide in the exhaust is less than one per cent as compared with four to 14 per cent for gasoline. If engines are kept in good condition, the emission of oil and carbon smoke is virtually non-existent. Exhaust from the gas-operated engines does not contain the odorous aldehydes which give gasoline fumes their obnoxious smell. Engines are appreciably more quiet in operation.

Conversion kits which are available from several manufacturers were used to make the changeover from gasoline to compressed gas. They were applied on the Lackawanna by railroad personnel. The principal components of a kit are a supply tank, a filter, a solenoid valve, a regulator and a carburetor or adapter. Operating difficulties have been practically non-existent.



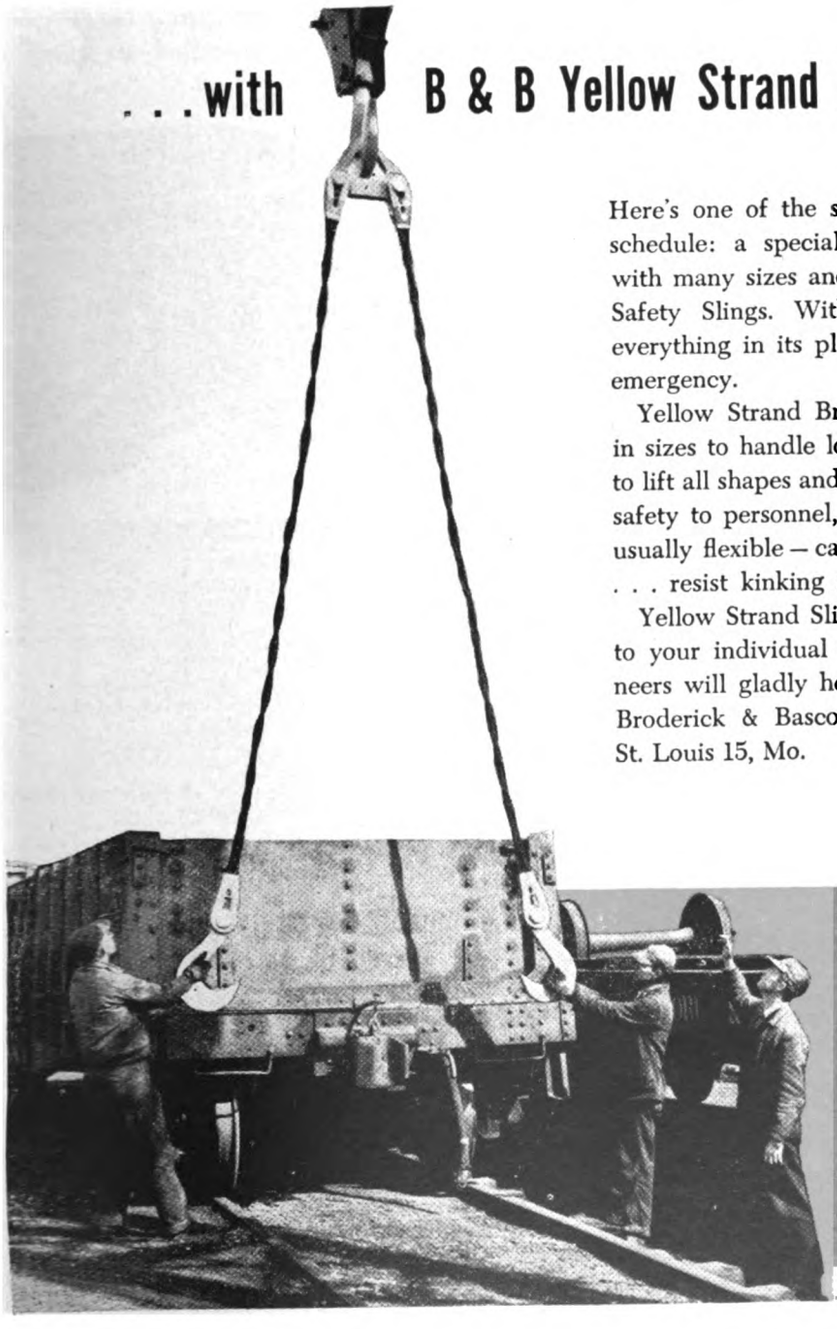
READY FOR ANYTHING

. . . with B & B Yellow Strand Braided Safety Slings

Here's one of the secrets of keeping the B & O on schedule: a specially outfitted "tool car" equipped with many sizes and types of Yellow Strand Braided Safety Slings. With a place for everything — and everything in its place — the B & O is ready for any emergency.

Yellow Strand Braided Safety Slings are available in sizes to handle loads up to 300 tons . . . are made to lift all shapes and sizes of loads . . . assure maximum safety to personnel, load and equipment. They're unusually flexible — can be installed and removed easily . . . resist kinking and twisting.

Yellow Strand Slings can be specifically engineered to your individual needs. Broderick & Bascom engineers will gladly help you with your sling problems. Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.



Yellow Strand®
WIRE ROPE

"Linking 13 great state

...and now the link

The B & O in its long-term rebuilding progra
offers a good example of how to get the *most*
of existing rolling stock. Cars suitable for rebuildi
get a complete going over. Back on line, they
ready for many years of *more efficient* service.

More efficient, in large part, because ASF Ri
Control Packages are installed on many cars. T

ith the nation"

s stronger than ever

O recognized that the Package was the next best ıg to a Ride-Control Truck . . . that Packages ɪed the most economical way of accomplishing the ɛctives of the B & O repair program. As a result, ɜe cars are ready for unrestricted use. And with required 2½" spring travel, controlled *laterally* as l as vertically, they are easier on lading, easier on the roadbed . . . easier on *themselves.*

This is more than a program of bringing older cars up to modern riding standards. It leads to modern *service* . . . modern *competitive* strength. See your nearest ASF Representative and find out how Ride-Control Packages can make an important contribution to your repairs program!

Bring your older cars up to modern riding standards . . . with

SF Ride-Control® Packages

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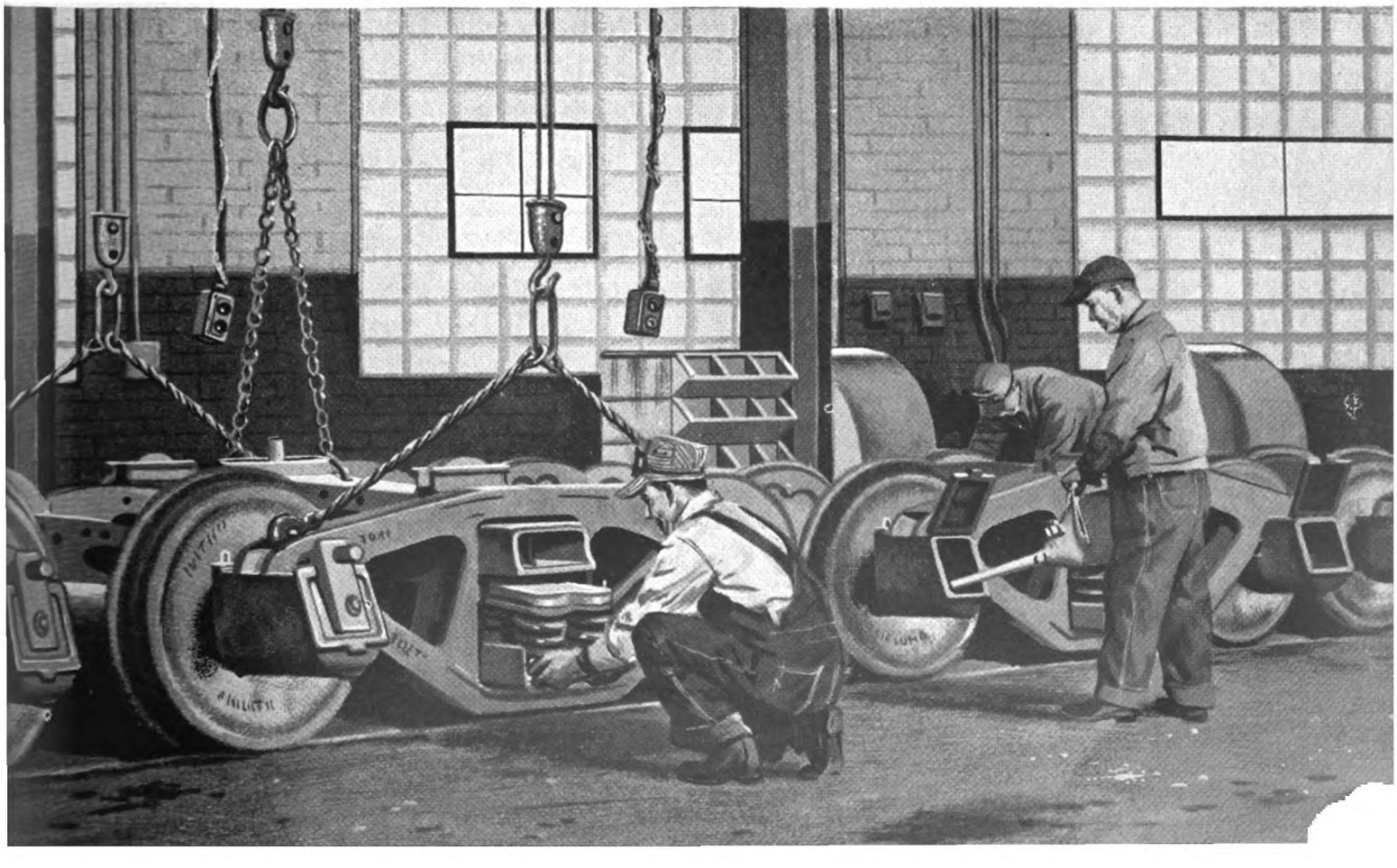
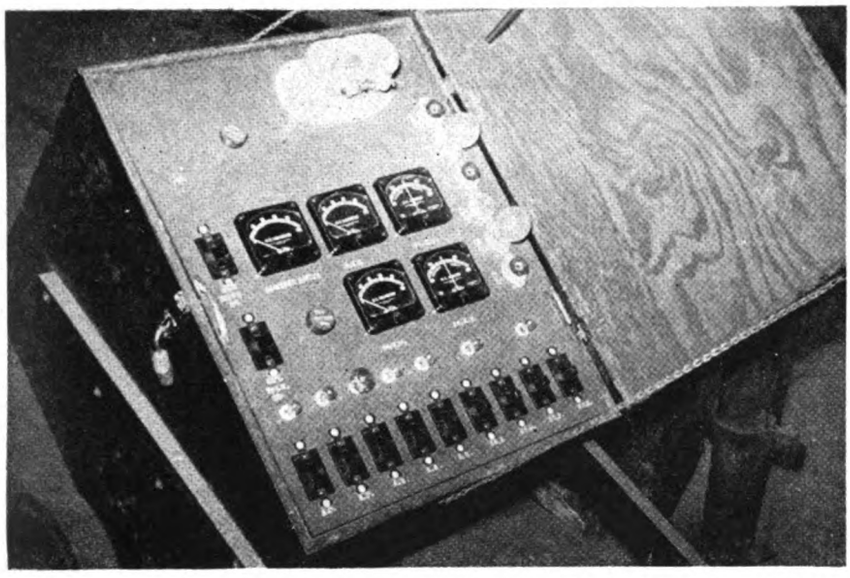
Prudential Plaza, Chicago 1, Illinois
Canadian Sales: International Equipment Co., Ltd., Montreal 1, Quebec
Other Foreign Sales: American Steel Foundries, International, S.A., Chicago





The brake tester uses a series of switches and meters to simulate brake operation. Switches at the bottom of the panel (left to right) are AC, AD, AE, AA-APL, AR-REL, 64P, 64N, 32P and 32N. Indicator lamps are immediately above. At the left side of the panel are the 64-V ***On-Off*** and the **GOV** pole switches and adjacent are the rheostats relating to these functions. Train line connector is at upper right, and below it are fuses protecting tester circuits.
The motor-generator set is located in the base of the cabinet.

When Florida East Coast Shops a Passenger Car . . . . .

Electro-Pneumatic Brakes Are Tested

WHEN THE FLORIDA EAST COAST shop at St. Augustine, Fla., sends one of the road's streamlined passenger cars back into revenue service after shopping, the car's HSC brakes have been thoroughly tested. This involves not only thorough overhaul and bench testing of the brake-system components, but also a complete test of the brake equipment after it has been reapplied.

The standard single-car test is made, and at the same time the FEC has an electrician perform a series of special tests to assure satisfactory operation of the car's brake wiring and of all those brake portions which have electrical components. This testing is done with a special mobile brake test cabinet, designed and built at the St. Augustine shop.

This cabinet, mounted on rubber tired wheels, is built of plywood. Under a cover at the top is a 24-in. by 24-in. panel board containing all of the switches, meters, rheostats and indicator lamps to simulate and reproduce the functions of the electric brake system. On this panel board is the standard 12-conductor train-ilne receptacle used on all cars with electro-pneumatic braking. At the back of the cabinet are three receptacles. One is for 110-volt a-c to bring shop power to the testing cabinet. The second is a 32-volt d-c receptacle which is connected with the charging receptacle on the car under test. Through this, the car's own battery voltage is supplied for testing the circuits which are normally fed from this source. The third is a connection for a cable which replaces the one normally running from the axle generator to the speed governor relay cabinet.

In the base of the test cabinet is a motor-generator set which can be regulated to produce the 74-volt, d-c used on the locomotive-fed train-line circuits. This m-g set has, as its 64-volt generator, a diesel locomotive fuel pump motor. This generator is driven by a 110-volt a-c, single-phase motor, purchased for this purpose. All of the ammeters on the panel board are diesel locomotive meters. All of the switches are DPDT car-lighting switches.

The base of this cabinet also provides space for carrying the cables necessary for operating the tester. One cable connects the tester with the electric-brake train line, one with the battery-charging receptacle, one with the speed governor relay cabinet, and the fourth is the a-c power connection.

An idea of the tests and test sequence is given in the accompanying table. The cabinet is wired so that only positive grounds are shown by the indicator lamps. Negative grounds are indicated by the sound of the m-g set when it is overloaded. Through the 32P and 32N switches, it is standard practice to feed 64-volt d-c to the 32-volt portions of the electro-pneumatic brake system to check for grounds due to moisture or other causes. All of the tests assure that a car going back on the road will give trouble-free service.

What and Why Of the Panel Board

Trainline Circuits and Operations

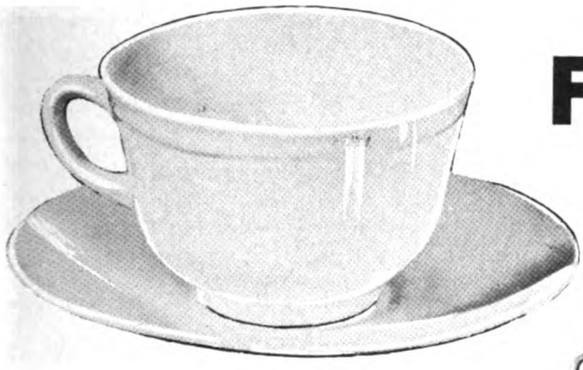
Motor-Generator Set, Generator Control Rheostat, and 100-volt scale Voltmeter. Produce 64 to 74-volt d-c to simulate output of locomotive auxiliary generator.

AA and AR Switches (DPDT), Indicator Lamps, and 64-volt Ammeter calibrated for 10 amp. Check continuity and crossed circuits in AA and AR wires and check operation of magnets in 21-B magnet valve by simulating locomotive brake valve operation.

64P Switch (DPDT) and Indicator Lamp. Check continuity of B+ wire

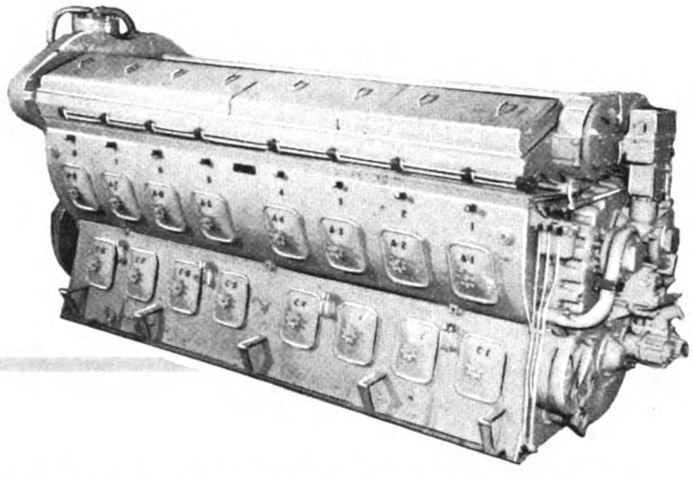
(Continued on page 54)

CLEANING



FROM

DINING CAR CLEANING
dishes, cutlery and utensils



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The New Kind of Research going on at International Steel

International Steel has been "designing out" corrosion and eliminating service failures through proper construction of component parts; now their "depth" research goes even deeper.

International Steel research begins with failures such as those pictured across the top of these pages. The research deals with failure causes—not superficial, but *basic* causes. For instance, the condition of the above car is not due to "corrosion" but bad design—antiquated construction.

*The Astonishing Story of "Bruised Metal"**

At the outset of World War II more ships than we cared to admit, cracked open on the ways—*new ships* launched straight to the bottom. At that time, research in steel "brittleness" had been going on since the mid thirties—but this type of failure stepped up research considerably.

Today International Steel is able to design against—and fabricate against the problems caused by "notch brittleness" in steel.

Punched holes, sheared edges, abrupt bends—in other words *definite geometric discontinuity*—a notch, section change or other changed area that is not completely eliminated by "minimum rigidity" welding—are all areas which become subject to "brittle fracture" under service conditions.

Localized "cold working" by "bruising" resulting from accidental impact loading such as dropping the steel or striking other materials during handling, is a direct invitation to brittle fracture in service.

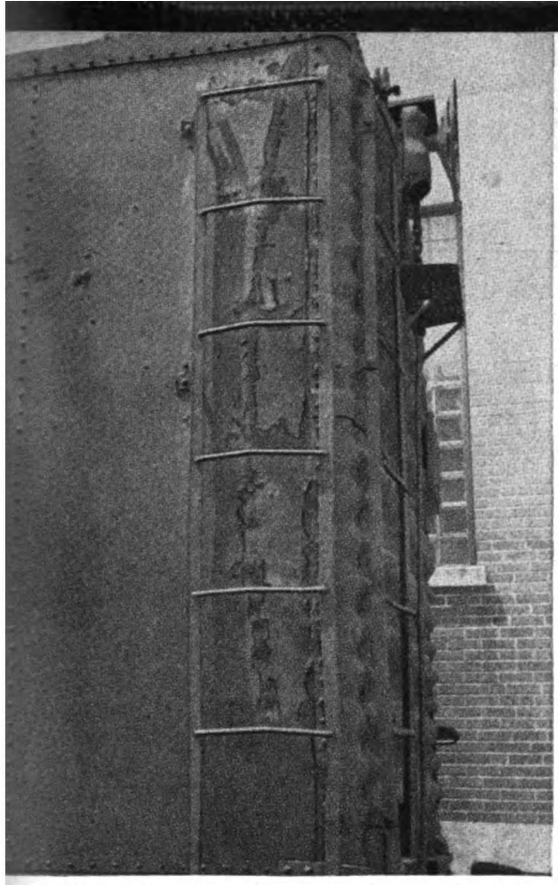
International Steel component parts and structures are quality controlled to prevent brittle fracture. The *knowledge* of this problem is International's best defense.

Greater care in choosing design details, in the selection of materials and in procedures of workmanship, fabrication, supervision and inspection are all part of the International precision process.

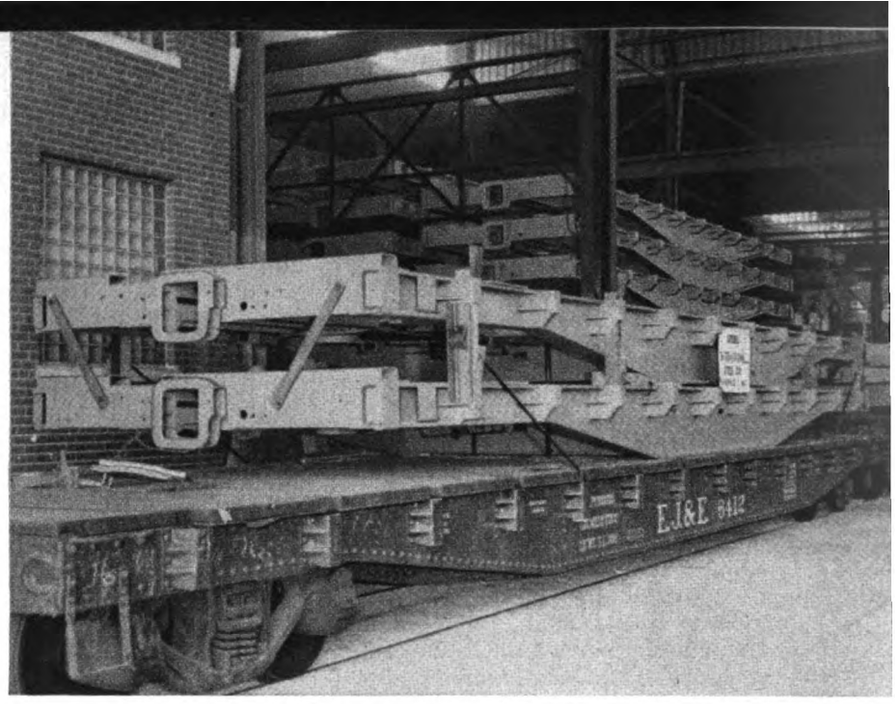
"A freight car is only as modern as the research and integrity that goes into its components."

INTERNATIONAL STEEL COMPANY
RAILWAY DIVISION · EVANSVILLE 7, INDIANA

For the complete study of "notch brittleness" and other failure causes, send for "Failures of Structural Components of Railroad Freight Cars."



e, again, International's research reveals that basic fault is not rough handling or corrosion, simply failure to design *against* such failures. rrective ***design*** and proper ***construction*** eliminate h failures.



The underframe is a classic example of an International development through "depth" research and corrective design. These underframes have the failure cause "designed out" of them. As a result—*no International Steel underframe has ever failed.*

the Unit Load Car

Although International Steel designs and fabricates freight car *components,* research into these parts often leads to revolutionary design such as the now famed "Unit Load" Car.

Components for this car are now being fabricated at International Steel. Soon thousands of them will be assembled at various shops throughout the country—and shippers will benefit by *ten hours of loading time at each end of the trip* in addition to the advantage of safely shipping unbarricaded LCL shipments—by the carload!

which is 64-volt feed for back-up brake valve on observation cars.

64N Switch (DPDT) and Indicator Lamp. Check continuity of AB (B—). Wire is common negative for all train-line circuits.

Ground Toggle Switch and Indicator Lamps. Show positive grounds on all circuits.

Individual Car Circuits and Operations

32-volt Voltmeter. Check car's battery voltage (32-volt on FEC). 32P and 32 N switches (DPDT), Ground Toggle Switch, and Indicator Lamps. Check continuity and positive grounds on cars own generating and battery system.

Governor Pole Switch (DPDT)—Simulates directional relay operation in speed governor relay cabinet.

Rheostat and 100-volt Voltmeter. Simulates variable voltage output of axle generator to energize and de-energize speed governor relays.

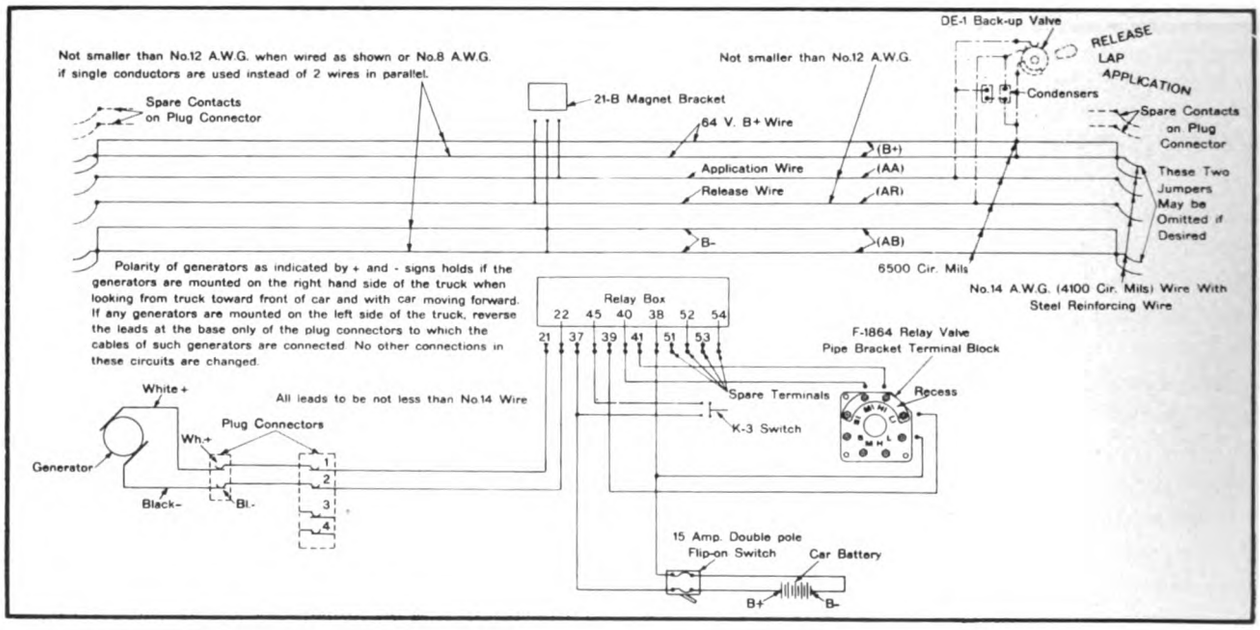
AC, AD, and AE Switches (DPDT), Indicator Lamps and 32-volt Ammeter calibrated for 15 amp. Check continuity, crossed circuits, and operation of wiring and magnets in speed governor relay cabinet.

Air Brake System

The 160 psi air gage located in the Brake Tester is connected to the straight air line of the car being tested. This gage is used to show and help locate air leaks on the car's brake valves and piping.

With the proper procedure of operating switches—AC, AD, AE, AA and AR and observing gage—it is possible to determine if there are any undesired leaks at the double check valve portion, application and release valve seats, and the seats of the F-1864 relay magnet valve. It is also possible to show crimped or ruptured diaphragms of the F-1864 relay valve.

The gage is also used to check the pick-up and drop-out pressure setting of the K-3 switch and the diaphragm cut-off portion located on the 21 B magnet valve portion. It is used to check application, release and self-lapping portions of the F-1864 relay valve.



Electro-Pneumatic Brake and Braking

THE HSC PASSENGER CAR air brake equipment includes the D-22-BR control valve which is the AAR standard for interchange passenger cars and includes the electro-pneumatic features for high-speed operation. The electro-pneumatic straight-air brake and the electro-pneumatic speed governor control are incorporated in a manner which permits their use for quick and flexible control at elevated braking ratios in high speed service. For simple automatic brake service, the electro-pneumatic straight-air brake is inactive; the use of the speed governor control is optional.

The automatic and electro-pneumatic functions are separated by a double-throw check valve located on the D-22BR control valve pipe bracket. An electro-pneumatic brake application initiated at the brake valve on the locomotive is automatically and quickly developed on each car in the train by the same relay valve which responds to automatic brake applications initiated by the control valve.

Components on cars include the 21-B magnet valve which pilots the application or release of the brakes on the car during electro-pneumatic operation, and the F-1864 relay valve which relays the application and release operation of the control valve or of the 21-B magnet valve, and limits brake cylinder pressure in relation to speed as controlled by the speed governor and relay cabinet.

Other electrical components include the axle generator which is mounted on an axle of the car to register train speed, and the relay cabinet located in the car which, in conjunction with the relay valve, limits brake cylinder pressure in relation to train speed as registered by the axle generator. A K-3 switch operates during a brake application to establish battery supply to the relay cabinet and relay valve magnets. A plug connector makes the wire connections

(Continued on page 56)

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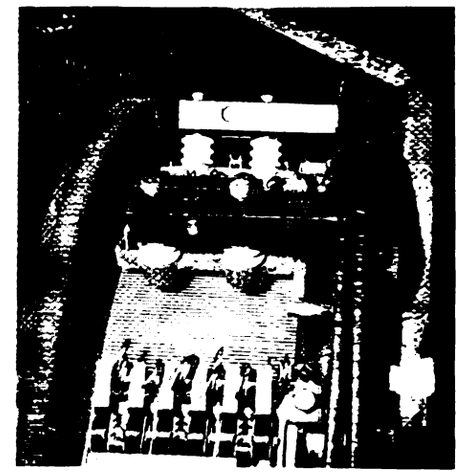
HOW MUCH DO YOU KNOW ABOUT BRUSHES?

How Should a Brush Grade Be Selected?

RAILROADS ARE INTERESTED in getting the most for their expense dollar. To do this with brushes, the brush for any given application should have the following properties.

1. Ability to commutate under all normal service conditions.
2. Freedom from breakage and shunt failure in service.
3. A friction level low enough to prevent excessive commutator heating and solder throwing.
4. Life of the highest level research and development can provide.
5. Uniformity from shipment to shipment.
6. The ability to maintain the commutator in Class A condition from one overhaul to the next, and preferably longer.

The selection of a brush grade for a motor or generator of new design is done by first studying the characteristics of the machine, the performance to be expected from it, and the operating conditions which will probably obtain. Then, based on knowledge of what grade will provide the commutation properties needed, a selection is made. Usually two or three grades are tested in order to bracket the normal variation between theoretical design characteristics and actual performance. The properties listed above, with the possible exception of commutation, must be confirmed from field tests. Usually, we know in a few thousand miles of service where the experience with breakage, shunt troubles, and friction is going to level off. To obtain life values requires a minimum of 50,000 miles of service. The ability to maintain commutators in Class A condition is usually known within 20,000 miles of service for all factors but ridging and/or copper dragging. Two or three sets of brushes may be required before ridging becomes apparent. Ridging is nearly always the result of failure to consider (or deliberate disregard for, in the case of unscrupulous praters of long life), the balance which must be maintained between commutation and life if the machines are to give long-term trouble-free service. It is essential that this balance should include a gradual sloughing off of the brush, not the commutator. Some brush purchasers feel that if a brush will commutate, then the harder the brush can be made, the longer it will last and therefore, the more money they save on brushes. Actually, hardness of itself has nothing to offer in the improving of brush performance lies in maintaining a partial equilibrium state between the commutator, commutator film, and brush face with the slight unbalance being on the side of the brush face. The grade which



maintains this condition to the greatest advantage is the one that usually is selected. Someone may ask, "Then why is it necessary to change brush grades on equipment?" The reason for this lies in the increasing demands that are being placed on equipment. The operating conditions have changed. Greater tonnages, higher speeds, and dynamic braking are only three of many changes. Increased mileage before overhaul, longer sustained high speeds, rerating of equipment, and changes in gear ratio are some other changes familiar to every diesel supervisor.

BY K. R. MATZ
National Carbon Company

This is the twelfth of a series of questions and answers which are appearing each month.

(*Continued from page 54*)

between the axle generator and the relay cabinet.

Four continuous brake wires extend from end to end of the car and are connected from car to car by a jumper cable with plug connectors. As indicated on the diagram, these train line wires consist of the application wire (AA); the release wire (AR); the B- wire or wires (AB) from the locomotive battery (64-volt standard); an dthe B+ wire or wires from the locomotive battery (64-volt standard) supply to the DE-1 back-up valve.

The application and release wires are connected between a master controller on the locomotive and the application and release magnets of the 21-B magnet valves on each car. Like magnets are energized and de-energized simultaneously by the master controller to apply or release the electro-pneumatic straight-air brake in accordance with movements of the brake valve handle on the locomotive.

Each car is individually wired for speed governor control. As shown on the diagram, the speed governor wires, L-1, H-1, M-1 and 1 (or B—) are connected between their respective magnets of the F-1864 relay valve and the relay cabinet. The relays in the relay cabinet operate at predetermined car speeds to energize or de-energize the magnets of the F-1864 relay valve and thus regulate braking pressures in relation to train speed as measured by the axle generator. Current supply is provided from the car battery (32, 64 or 110-volt).

The K-3 switch is wired in the battery circuit to the relay cabinet. It operates to establish battery supply to the relay cabinet and relay valve magnets when a brake application is made, thus conserving battery current when the brakes are released.

—Excerpts from
New York Air Brake Co. Pamphlet 6

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For details of the how . . . where . . . and *why* of Elastic Stop nut application to freight car vibration and maintenance reduction, write Dept. N35-328

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From the Diesel Maintainer's Note Book

Do High Voltage Peaks Cause Flashovers?

MR. GORDON TAYLOR is to be complimented on his interesting and instructive monthly articles under the heading "From the Diesel Maintainer's Note Book." His narratives also call to mind experiences which most of us have had in the diesel locomotive field. Naturally, sometimes, as is the case with most physical evaluations, some of us disagree with Mr. Taylor's explanation of the cause of a defect which is always so clearly stated at the beginning of the article.

I would like to discuss some of the comments made in the article "When Amps Go Up, Volts Go Down", in the January issue of this magazine. First, I would like to define the word flashover as the flow of a very high amperage current generally through air between points of considerable difference in electrical potential. The flow of electric current through any path is directly proportional to the resistance of the path and the voltage across the path. I interpret Mr. Taylor's use of the word "leakage path" in the second paragraph of his article to be a conducting track caused by dirt or contamination through which not more than a few milli-amperes will flow when the generator is operating at its maximum voltage and its magnetic field is saturated. I suggest that the resistance of such leakage path is not changed by any condition leading up to a flashover nor is it changed until after the flashover has been initiated and that the change in the leakage path observed after the flashover is the result of the flashover and had little to do with causing the flashover. The high voltage peak which Mr. Taylor refers to in the second paragraph of his article apparently is the voltage stress impressed on the normal generator voltage by switching or load surges. It is my understanding that such voltage peaks are considerably less than five times the normal voltage. If we increase the voltage across a fixed resistance or leakage path five times, we will increase the ampere flow through that leakage path five times. If we had 10 milli-amperes flowing in the leaking path prior to the advent of the peak voltage, we would have 50 milli-amperes flowing in the leakage path under the peak voltage condition. I suggest that it takes the flow of hundreds of amperes, rather than milli-amperes to create the phenomenon known as a flashover.

In the sixth paragraph, Mr. Taylor infers that the high voltage peaks which caused the flashover under consideration were caused by the failure of the locomotive control to make transition at the desired time. From this remark, I infer that Mr. Taylor is suggesting that the voltage will at least double, if not increase higher than that, if a locomotive unit does not make transition and the speed of the locomotive would increase beyond the point at which the next transition should have been made. A look at the main generator characteristic curves will show for any diesel electric locomotive system which has been used in the United States in the past 15 years, that transition is not initiated until the generator voltage is past 90 per cent of the ultimate value that the generator is capable of producing. If a locomotive power plant does not make transition when designed to do so, the subject of this article does not apply as the amperes cannot go up and cause the volts to go down. On a reasonably maintained locomotive electrical system the only result of not making transition will be loss of power. I would like to see an explanation of the genesis of the high voltage peaks referred to in paragraph 6 that are caused by a locomotive failing to make shunt transition.

In the second paragraph on page 62 of Mr. Taylor's article, he infers that the reason that the main generator voltage is not increased progressively throughout the full range of locomotive speed to match the counter EMF of the traction motor is because "any material voltage increase might spark a flashover." I suggest that the facts of the situation are that it is not practical or economical to design such a system when it is possible to design the system in current use. On locomotives and cars which receive their power from an outside source, such as a trolley wire, third rail, or similar system, transition is used in the broad meaning of the word and yet the voltage of the power

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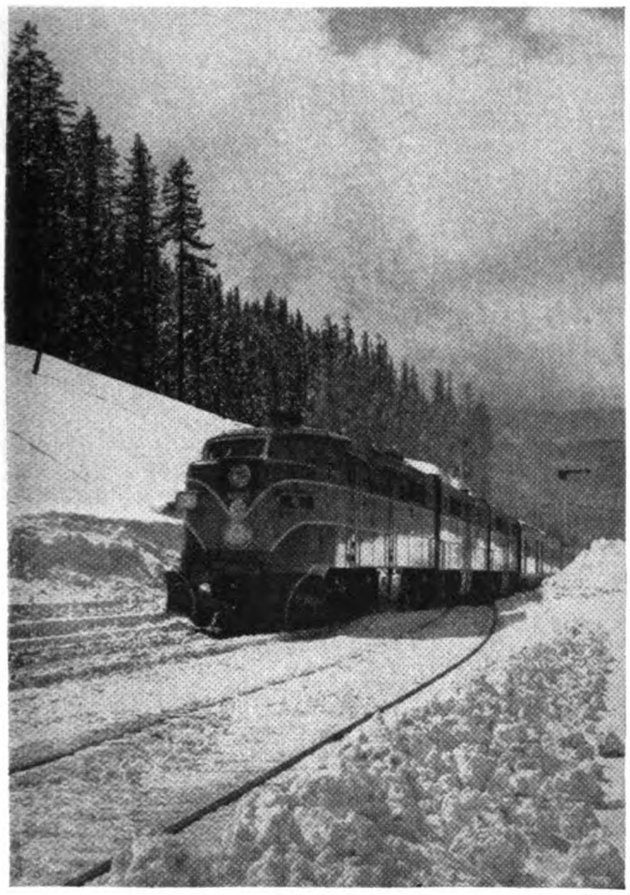

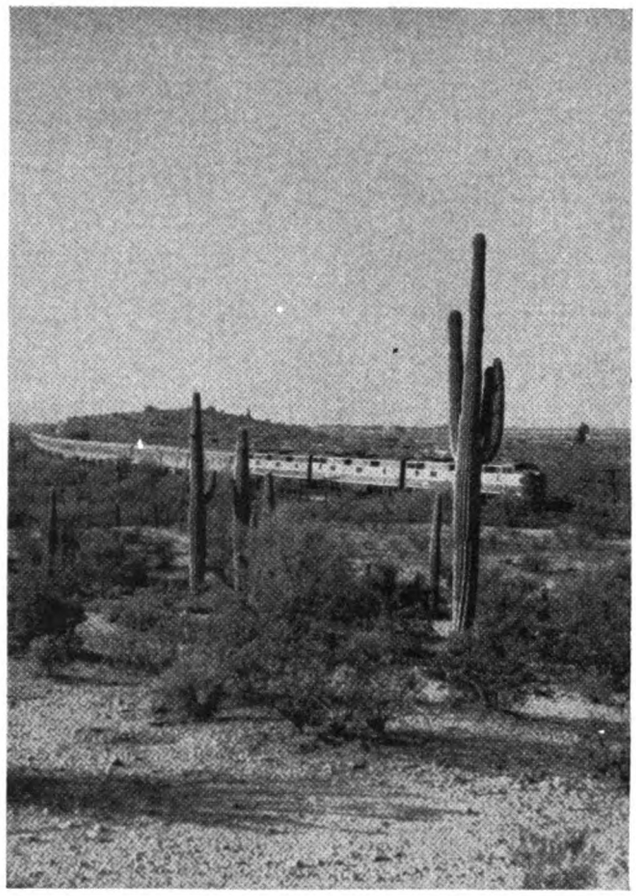

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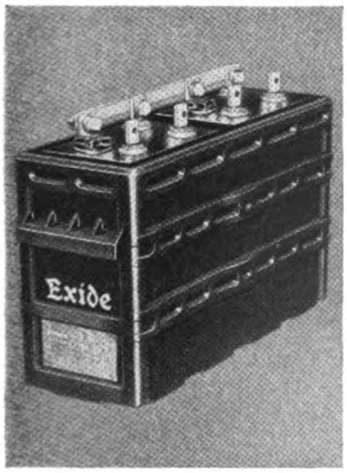

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From the Diesel Maintainer's Note Book

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plant remains at its peak value since these systems are constant potential systems. I suggest that for a diesel-electric locomotive, there is no engineering reason other than physical size and high cost that would prevent a constant potential generator to be applied.

It appears to me unfortunate that Mr. Taylor puts so much emphasis on the field shunting part of transition and so little emphasis on the parallel transition steps when each step of transition is equally important and a considerably wider range of locomotive speeds are obtained by the parallel transition connection than by either of the shunting transitions when restricting our discussion to the type of transition used on Electro-Motive locomotives. I believe it pertinent to remark that locomotive operation could be successfully obtained but would be a bit more restricting without any shunt transition whatsoever. Many railroads have in service locomotive units which only have parallel transition. Admittedly these locomotive power plants do not have as wide a range of constant horsepower operation as do those locomotives which utilize the advantage of field shunting to smooth out and extend the constant horsepower portion of their generator curves.

In closing I wish to again compliment Mr. Taylor on his articles, including this one, and thank him for giving me an opportunity for a public discussion of a subject which in my opinion is poorly understood at the diesel locomotive maintenance level.

C. W. MARTIN
Assistant Engineer—Diesel Electric
Baltimore & Ohio Railroad

Little Peaks Will Do It if Insulation Is Bad

Dear Mr. Martin:

In your letter of February 3 concerning a "diesel note" in the January 1958 issue of *Railway Locomotives and Cars,* you apparently object to my theory that flashovers are caused by a high voltage surge, sufficient to spark a current through a leakage path in the main generator or traction motor. I also believe that improper motor shunting contributes to high voltage peaks in the main generators. With this as a basis for discussion, let us consider my attempt to explain the case which was outlined in the story.

Apparently, we have the same idea of what takes place when a flashover occurs. It is a flow of heavy current, between two points of opposite polarity that causes an electric arc highly destructive to anything in or near its path. The question is what starts the flashover?

The generator and its circuit is well insulated to confine and hold the voltage that is normally developed. In fact, the insulation when new and clean, will confine a reasonable amount of excess voltage to its proper circuit.

If a traction generator could always operate with its insulation and with the insulation of traction motors in new and perfect condition, then flashovers would be extremely rare. I believe you will agree to that. When that is the case, then what causes the voltage to break out of its insulated circuit and go crashing across to a point of opposite polarity?

My theory is that it takes a leakage path and a surge of voltage to start a flow of current to a point of opposite polarity. This leakage current can be quite small at the start, but the small sparks that occur in the leakage path, cause the air in the surrounding area to become ionized and set up a conducting path. The generator and its current-carrying parts are under high voltage stress and the insulation can no longer confine the voltage, with the leakage path in operation. So it relieves itself by breaking through the leakage path and the ionized air to a point of opposite polarity. That is what we call a flashover. The maintainer who has to clean up the mess and make repairs, probably calls it something else.

In your letter, you say that you think that I (Gordon Taylor) am suggesting that "the voltage will at least be double if the control fails to make proper transition." I do not hold such belief and am sorry you got such an impression. I cannot find that I mentioned such a voltage value in my story. I have personally observed a voltmeter connected across the main generator on road trips, and never saw anything to cause me to think the main generator voltage would double in case o failure of shunting circuit.

When the generator voltage reaches full value, it may require only 40 or 50 more volts to trigger a breakdown across a good leakage path. A failure of the control circuit to operate motor shunting at the proper time will allow the voltage to climb 40 or 50 volts higher.

The circumstance reminds me of a river at its flood stage, with water lapping at the levee top. You have water under pressure looking for a weak spot, a leakage path if you please. When it finds that spot then you have destruction unless the weak place is repaired immediately. That is a poor comparison, because when the generator voltage finds the weak spot, it is already too late.

The points that I hoped to make in my Diesel Note were about as follows: It is important to maintain high insulation values on a diesel locomotive. Since that is sometimes difficult to do, then one must do everything possible to avoid high voltage peaks by maintaining proper transition control.

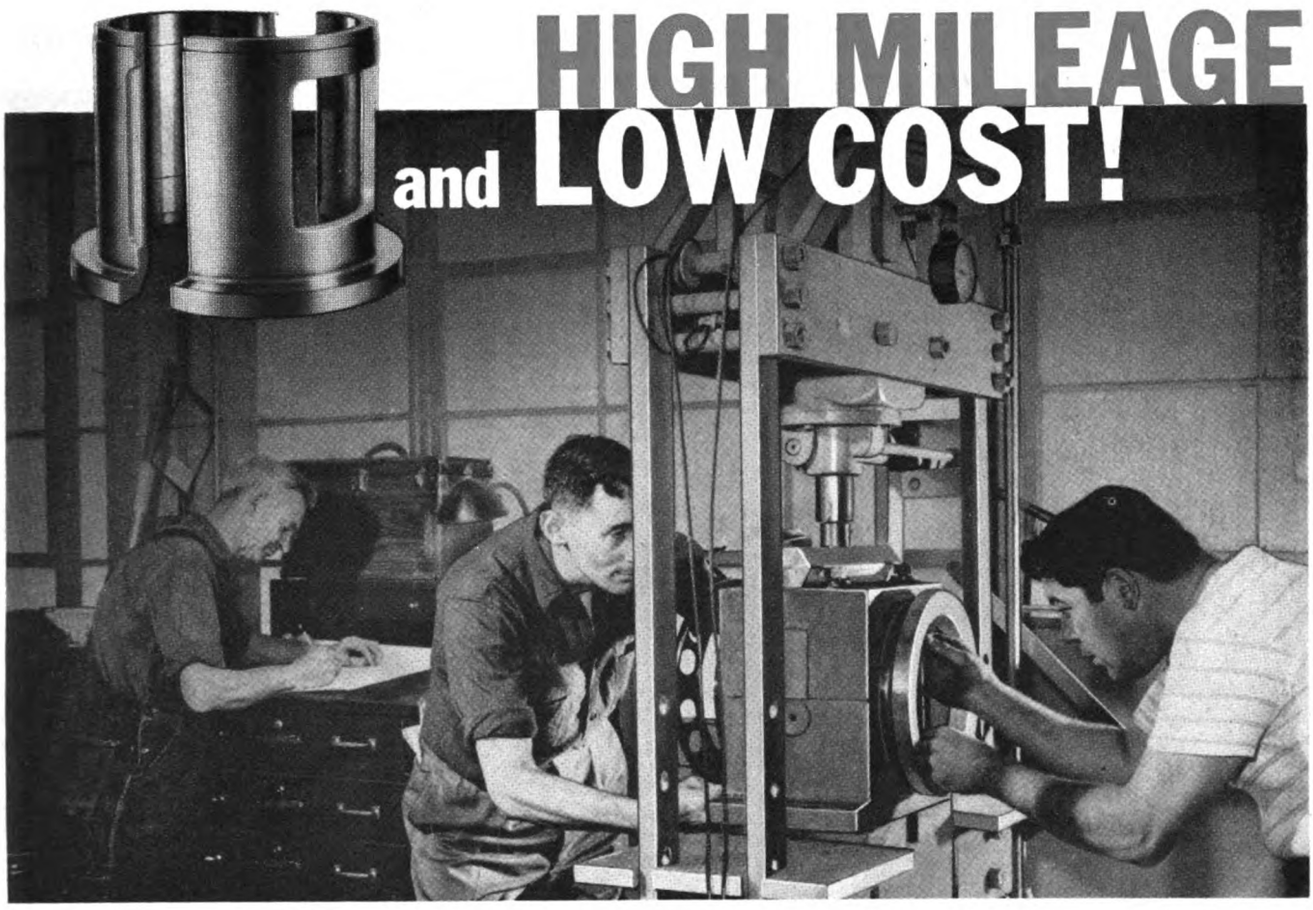
In my experience I have never had a flashover on a locomotive with insulation in first class condition, and no broken or swinging circuit connections. I have had many cases where the insulation value was low, which means where leakage paths exist. It has been said that "man is as old as his arteries, and a motor is as old as its insulation." There is lots of truth in that, so it is necessary to keep insulation values up and avoid high voltage peaks.

At this point, I will let you in on some details that did not appear in the original story. The generator failure under discussion was the second severe failure of its kind in that particular lot of locomotives. I made a vigorous complaint to the builder, and he sent one of his engineers who had a great deal to do with the generator design, to assist in locating the cause of the trouble. When we discovered the faulty condition of the motor shunting control, the generator designer did not hesitate to say that was the cause of the trouble.

When the control corrections were made, the trouble ceased, and I have since been a strong advocate of transition control, especially motor shunting taking place at the proper time. It all boils down to the fact that somewhere excessive voltage values in a main generator may develop strains in circuit insulation which are sufficient to cause breakdown.

I am glad to note that you like the "diesel notes," and that you urge their continued publication. All of these notes are based on actual experience, and the remedies suggested are those which have resulted in benefit to locomotive operation. Perhaps I have not always made myself clear in my explanations, but there is no question as to the accuracy of what occurred, and what was done to correct the trouble. Perhaps your readers can suggest better corrective methods.

GORDON TAYLOR



Here's why Diesels, Electrics and MU Cars can all get maximum, trouble-free mileage with Magnus Traction Motor Support Bearings

Major roads from coast to coast have found that they can be sure of maximum mileage between overhauls by replacing only with genuine Magnus HIGH-MILEAGE Bearings. This performance is possible because Magnus puts extra care and precision into every bearing. Here are just a few of many Magnus features that mean more trouble-free miles and lower over-all costs.

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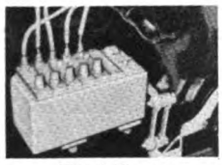
Straight Bore or Hour Glass Design Many railroads today still prefer the straight bore design and now Magnus is your only source for these bearings. Magnus gives you either type — to your specifications.

Magnus Bearings are now available for replacement on all types and makes of diesel electric and electric locomotives and MU cars. And because of Magnus' streamlined production methods, new bearings cost so little that it doesn't pay to reline or rebuild old ones.

For the complete story on Magnus HIGH-MILEAGE Traction Motor Support Bearings, write for Bulletin No. 6000. Magnus Metal Corporation, 111 Broadway, New York 6; or 80 E. Jackson Blvd., Chicago 4, Ill.

OTHER MAGNUS PRODUCTS FOR DIESEL LOCOMOTIVES



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Safety Valves

Fuel Tank Sight Gages

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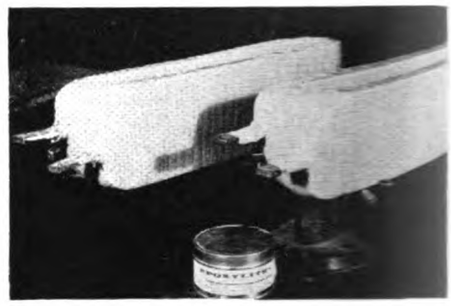
(*Continued from page 14*)



Field Coil Insulation

An insulation for field coil rewind, consisting of a void free, epoxy resin-fiberglass laminate of extreme mechanical strength, is now available after two years of successful tests on western railroads. The application requires no special equipment.

According to the manufacturer, the easy-to-apply insulation has excellent electrical and thermal properties and is practically impervious to moisture, grit, oil, dust, etc. The coil can be potted on pole piece to assure freedom from coil movement, and resistance to mechanical vibration from roadbed. The insulated field coils are said to run cooler due to elimination of air films in tape wrapped coils with the insulation having outstanding adhesion qualities to copper and steel. *Epoxylite Corporation, Dept. RLC, 10829 East Centra ave., El Monte, Cal.*

Plastic Coating

A new plastic coating, Freight Liner 410, applies a smooth moisture and chemical resistant surface to the interior of steel covered hopper cars. It is non-toxic and has been approved for use in the storage and shipment of bulk food-stuffs. Freight Liner 410 has been service tested for two years by several railroads. It can be applied to two coats with ordinary spray equipment at any temperature. Preparation involves sandblasting the surface to be coated to remove rust, paint, moisture, oil and grease.

Another new plastic coating, Freight Liner 700, has been developed for the quick repair of cracks and rough or gouged areas in box cars. *Archer-Daniels-Midland, Dept. RLC 700 Investors Bldg., Minneapolis 2.*

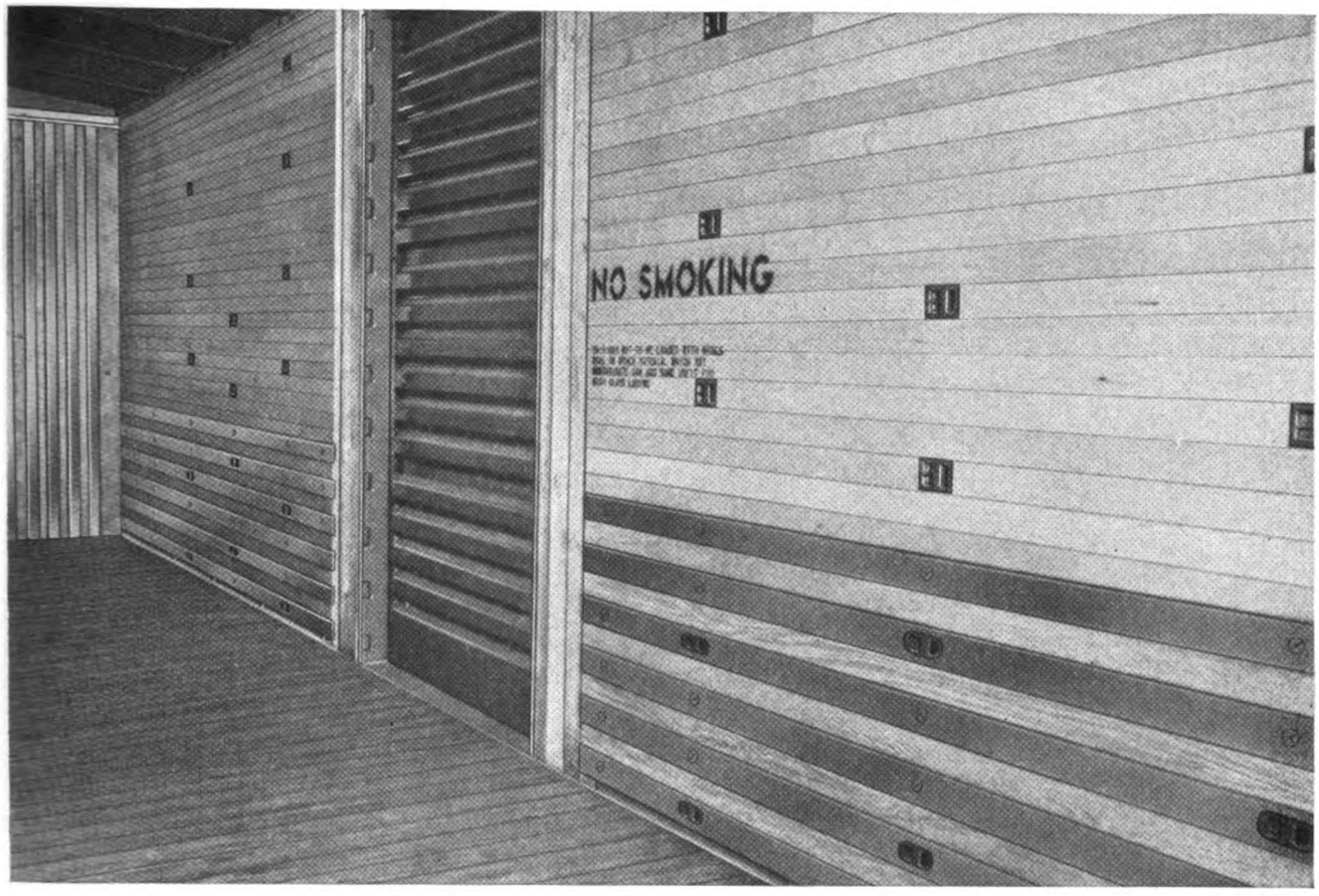
Lining Material

Vyflex Fligid, a new lining material consisting of unplasticized polyvinyl chloride, is said to protect base materials of both ferrous and non-ferrous metals, concrete and wood. It resists a broad line of corrosive chemicals ranging from concentrated oxidizing acids to highly concentrated alkalies, also a large number of corrosive organic chemicals.

The lining is produced in continuous sheets

(*Continued on page 64*)

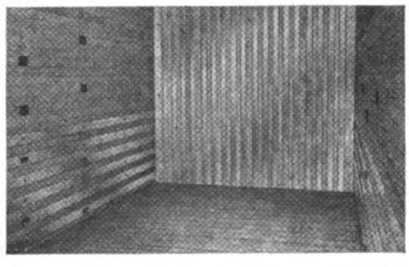
Here's **STANDARD'S** *responsibility to the railroads at work...*



Now, **SIDE LINING** joins Standard's Line-Rite team!

Side Lining and End Lining slash maintenance costs and out-of-service time!

Line-Rite Side Lining is a rolled, steel slat type bar designed to provide an alternate wood and steel face to the interior of the lading compartment. Dovetailed metal sockets lock each board positively and securely in place. Flanges give added support to the inserts. Side Lining is *four times stronger* than ordinary wooden lining . . . affords greater protection from excess condensation than all metal linings. This new construction provides strong protection from damage by fork lift trucks and tractors. You reduce maintenance costs, out-of-service time and shipper inconvenience . . . you'll have more cars available for high class lading. Yet Side Lining is easily installed, adaptable to any size car and does not add severe weight penalties. Wall coverage and location of lading anchors are to your specifications.



The Line-Rite End and Side Lining team virtually eliminates the replacing of broken and missing lining boards, and makes many more cars available for profitable high class lading. Ask your Standard representative for details.

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If money's no object — you can floor 'em with *gold*! But if you're budgeted closely, with lots of B and C cars to upgrade, then PLASTINAIL offers you:

1 — A super-smooth Class A floor

2 — That will outlast a new wood floor and remain in Class A service virtually all its life

3 — At as little as 2/3 the cost* of new wood.

*PLASTINAIL for ¾" coverage of a 40'-6" box car is only $138.

Installation time: approximately 20 man-hours.

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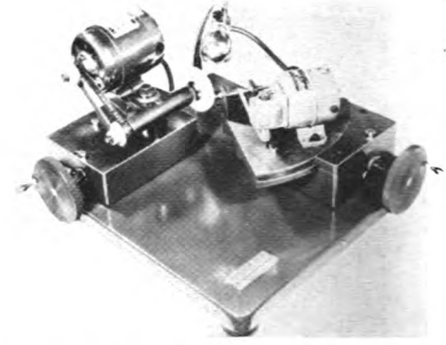
What's New

(Continued from page 62)

When applied, it is secured to the base material with a cement that bonds with an average of 25 lb per linear inch peel strength. Joints between individual panels or sections are hot-gas-welded with an unplastized polyvinyl chloride filler rod or strip to assure a homogenous surface. *Wagner Bros. Inc., Equipment Division, Dept. RLC, 7800 Dix rd., Detroit.*



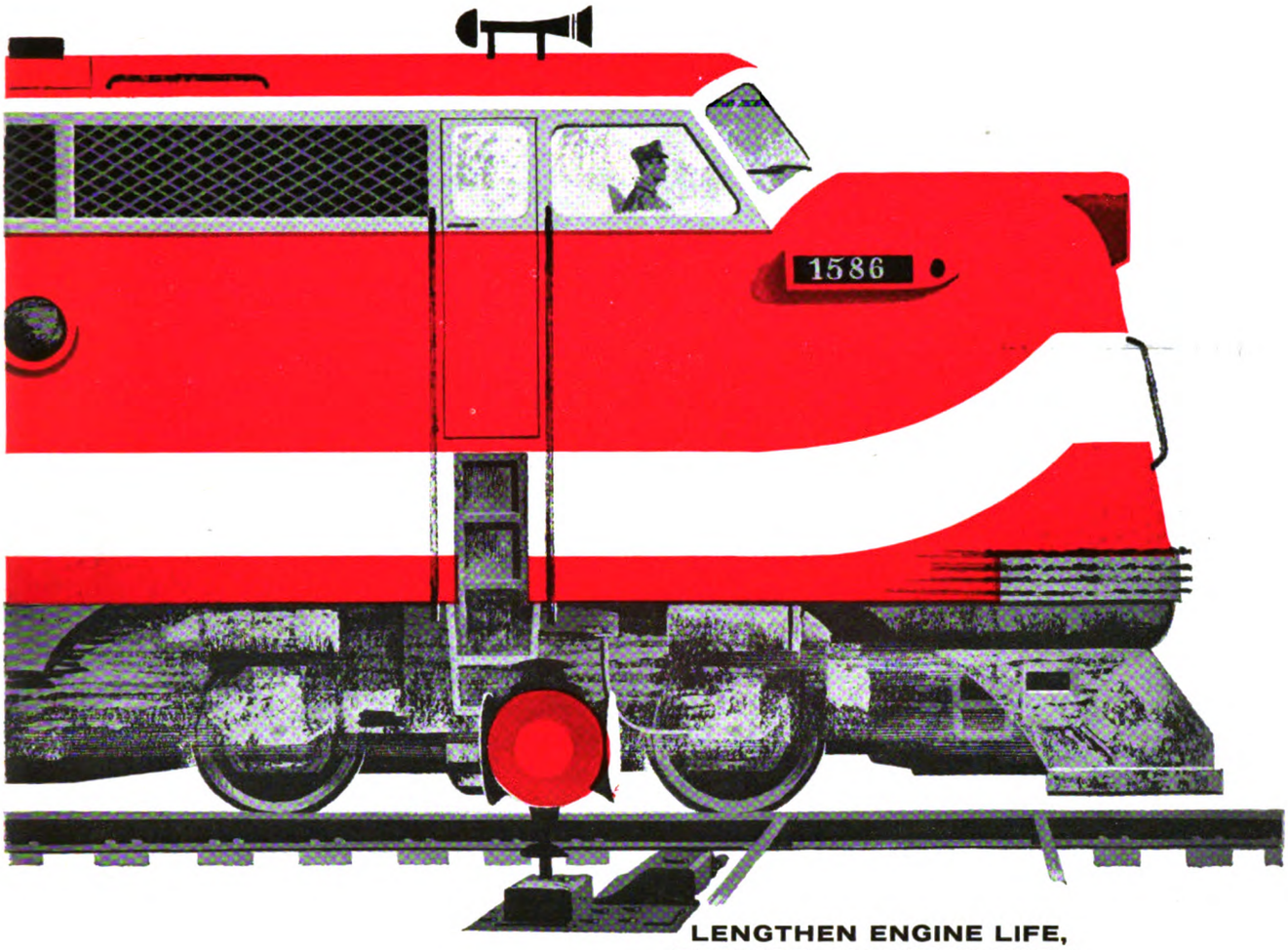
Diesel Nozzle Valve Grinder

The Federal diesel nozzle valve grinder FMT No. 1 has the approval of American Bosch Arma for the reconditioning of injector nozzle assemblies for diesel engines. The nozzle is driven in a V rest by a separate motor to assure absolute concentricity with the cone. The grinding head is built to an accuracy assuring the highest degree of micro finish. It can be used with 110-volt, ac or dc current. *Federal Machine Tool Company, Dept. RLC, Emmett st., Bristol, Conn.*

Insulation Resistance Tester

The redesigned Vibrotest Model 250 is capable of making resistance measurements from 1 to 50,000 megohms. It is a portable type for

(Continued on page 66)



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Esso Airfil Coating Oil adds outstanding dirt pick-up properties to diesel air intake filters. Airfil protection is so effective that it pays off handsomely in reduced abrasive wear, lowered repair costs, longer engine life. ¶ Airfil also shows superior wicking qualities. Successive layers of dirt and dust are quickly wetted, exposing a fresh, efficient dirt-retaining surface at all times. ¶ Applying Airfil is simple. It goes on rapidly as a hot liquid and cools to a gel-like solid that retains its consistency at engine-room temperatures. And since Airfil is insoluble in water, it stays on the filters, even in the wettest weather. It can, however, be readily removed by a hot detergent wash or a steam blast.

Airfil's cost-cutting advantages make it ideal for passenger car air-conditioner filters too. For further information or technical assistance, call your local Esso office, or contact: Esso Standard Oil Co., Railroad Sales Division, 15 W. 51st St., New York 19, N.Y.

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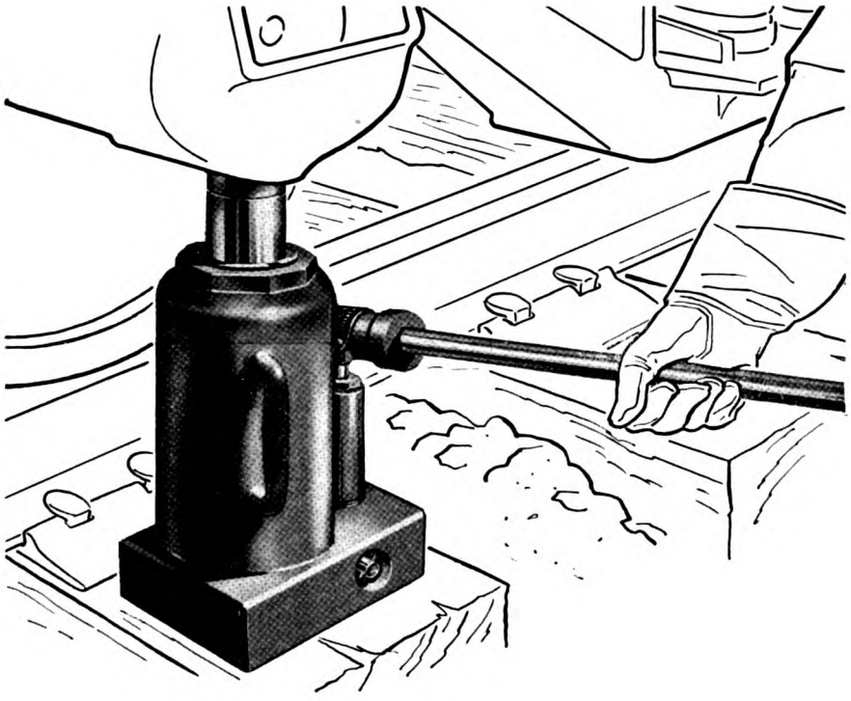

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You asked for it and here it is—a brand new jack designed and built especially for servicing heavier freight cars. It can raise 35 tons 6 inches—is only 9.7 high—weighs but 55 pounds. With the 35H9.7, the job of inspecting and renewing journal brasses can now be done without the danger of overloading a lower capacity hydraulic journal jack—and the work can be done faster with less effort! If you have the problem of lifting heavy cars, we suggest you get complete details on this new 35 ton hydraulic journal jack immediately. Write the world's oldest and largest manufacturer of lifting jacks for bulletin AD-16-G.

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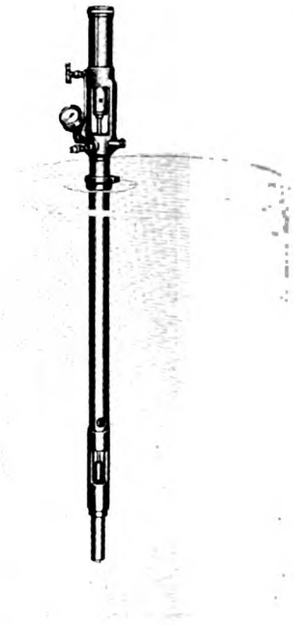
Ratchet Lever
Spur Gear, Electric

(*Continued from page 64*)

testing, inspection and maintenance of motors, generators, cables, electronic circuits, etc. Input is 115 volts, 50-60 cycle a-c. There are two calibrating controls, two push buttons and a range switch. The scale is calibrated 1-50 megohms, multipliers are 1, 10, 100, and 1000, and a nominal test potential of 500 volts d-c is regulated from four standard voltage regulator tubes. Test voltage regulation is constant within ½ per cent over entire megohm range for line voltages of 95 to 135. The instrument weighs 14 lb, and is furnished in a welded steel case with removable cover, carrying handle, three 5-ft test leads, 5-ft line cord and complete operating instructions. *Associated Research Inc., Dept. RLC, Chicago 18.*



Paint Pump

This bung-type air-operated material handling pump is said to cut handling costs by pumping paints and coatings direct from original shipping drums to paint stations. This Pogo Pump, a 17½-lb unit, can supply up to four spray guns either directly or through a paint-circulating system. The sealed, permanently lubricated air motor is separate from the pump to prevent fluids from harming motor parts.

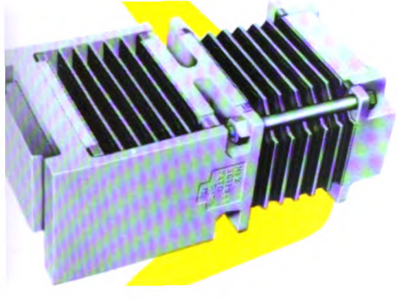
These pumps deliver at the rate of 1 gal per min. The pump can be inserted into a standard 2-in. bung or mounted directly on the rim of an open 55-gal drum by means of a simple auxiliary clamp.

Where constantly mixed coatings are required, an agitator may be mounted with the pump on a portable pump drum cover. *Binks Manufacturing Company, Dept. RLC, 3123 Carroll ave., Chicago 12.*

(*Turn to page 68*)

QUIPMENT MODERNIZATION Key to Successful Railroading

National Rubber Draft Gears
on the Great Northern



is the 65,500 foot-pound cushioning ca-
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ear that reduces center sill stress as much
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National Rubber Draft Gears are daily providing a high degree of impact protection to freight cars on the Great Northern Railway. This includes GN ore cars which are used in the most rugged type of service.

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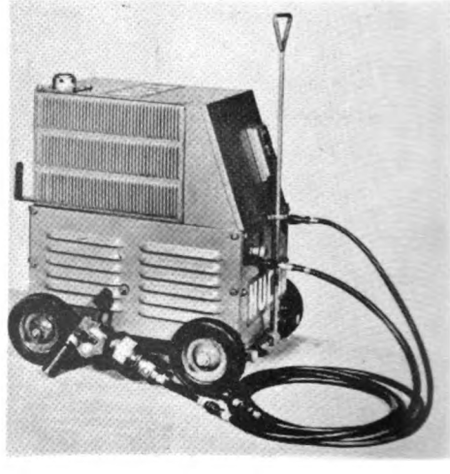
(Continued from page 66)

Hoist Trolley

The Hoistractor, powered by an axial-piston type air motor, exerts 250-lb drawbar pull on a beam through a spring-loaded Neoprene drive wheel. The trolley will pull a two-ton load at 70 fpm. Speed can be varied from a slow creep to full speed at 150 fpm. A single one-hand control for hoist and tractor is available in two types. Both types control raising and lowering the load by hoist and moving the load by Hoistractor. Both leave the operator one hand free to guide the load. One type is a pendent control and the other is swiveled rod with four-way grip control. Piston-actuated air controls permit smooth acceleration and deceleration and mechanical brakes provide positive stopping action so the load can be spotted easily. *Gardner-Denver Company, Dept. RLC, Quincy, Ill.*



Hydraulic Power Pack

This heavy-duty hydraulic Power Pack is designed to operate the Huck Model 146 hydraulic driving tool. Model 805 is a portable electro-hydraulic generator. Operating at

(Continued on page 70)

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the most practical tested lubricator

In general interchange service on roads in all parts of the country, in all temperatures. This on-the-line testing, combined with 39 years of journal box lubrication experience brings you this more efficient lubricator.

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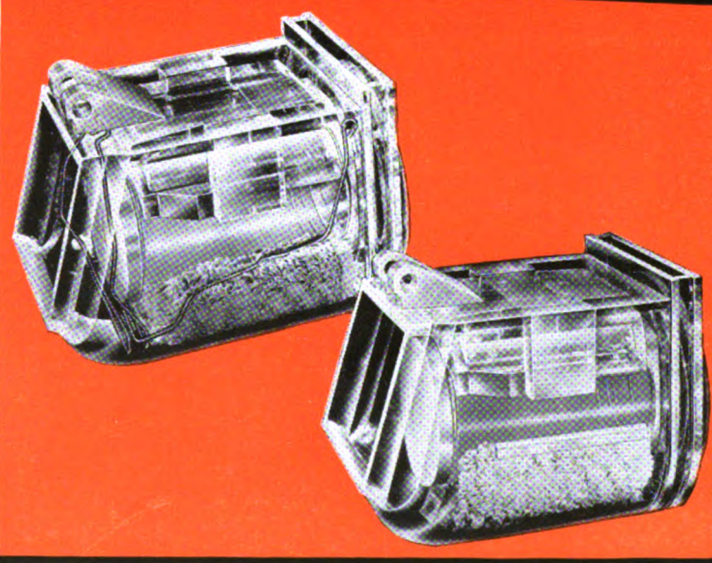
Journapak is a three-section, reversible, reclaimable lubricator of heavy tufted non-glazing cotton chenille, wrapped completely around three separate resilient blocks of synthetic rubber foam, which absorbs 300% of its own weight of warm oil.

Journapak — designed to eliminate glazing, waste grab and unnecessary yard labor. Journapak combines all efficient advantages found in all other modern lubricators with no sacrificing of lubricating coverage.

"39 years of railroading experience have built SECURITY for you!"

AD 957

The only reversible journal lubricator that fits contour of standard journal box without distortion of lubricator structure.



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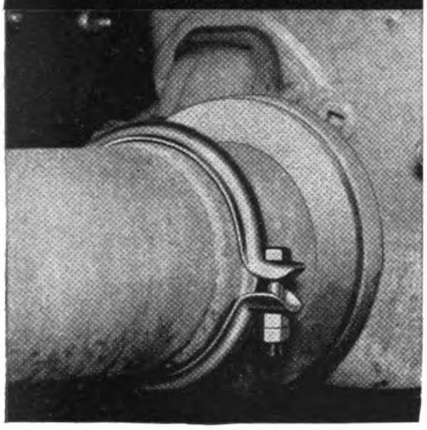
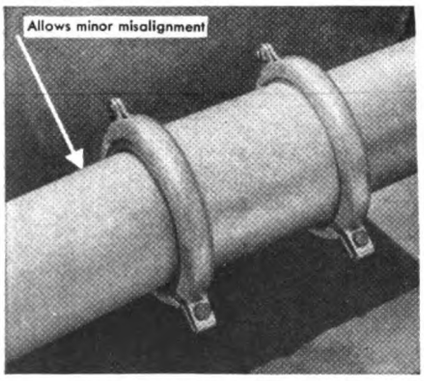


SERVICEMASTER V-BAND TUBE JOINT

for diesel engine exhaust systems features quick installation and disassembly for servicing. Bolted flanges are eliminated. Available in corrosion-resistant and mild steel for tube sizes from 1½" to 4½".



FLEXMASTER PIPE COUPLING

for diesel hot water and lube oil systems features quick assembly, with no pipe cutting or threading. It absorbs vibration, allows minor misalignment. In sizes for 2½" and 3" pipe.

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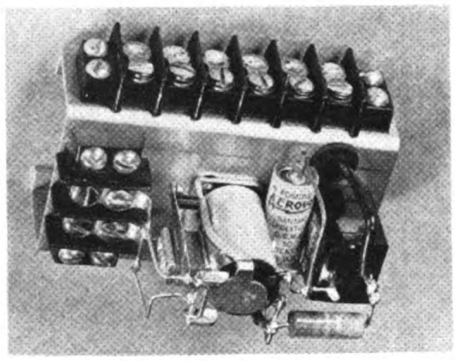
What's New

(*Continued from page 68*)

3,000 psi oil pressure, the new Power Pack is capable of driving the Model 146 tool at approximately 84 cycles per min.

The 2-hp drive motor operates on 220/440 volt, 3-phase, 60-cycle current. The hydraulic pump has a rated delivery of 3 gpm at 1,800 rpm. A combination oil cooler and reservoir assembly has a total oil capacity of 6 qt.

Optional equipment includes a totally enclosed fan-cooled electric drive motor. Another option is a flow control valve which permits selection of a lower delivery rate to operate the smaller Huck installation tools. *Huck Manufacturing Company, Dept. RLC, 2480 Bellevue ave., Detroit 7.*



Phase Sequence Switch

The Model 454 phase sequence switch is an automatic control device that protects polyphase electrical equipment from damage if connected to line in wrong phase sequence. Basically designed for 50-60 cycle equipment, it may be modified for 400-cycle service. Some uses of the control contacts are to shut off interconnected equipment, sound an alarm, or reverse phase connections.

The unit is said to operate over a very wide temperature range. It can be encased or used as a separate piece of auxiliary equipment. Construction is open chassis type, with overall dimensions of 2¼ in. wide, 3⅛ in. long and 2⅝ in. high. A six-terminal strip on side of chassis provides connection for either 220 or 440 volts, 3-phase input, also two terminals for connection of circuit to be controlled. *Associated Research, Inc., Dept. RLC, 3777 West Belmont ave, Chicago 18.*

Metal Surface Coating

A coating, colorless as water, protects bare non-ferrous metals, and will restore the color and gloss of faded or enamel films. Magnus Water-White Clear Coating FF-111, which has been field tested on diesel locomotives, signs and stainless-steel surfaces for more than three years, does not peel or turn yellow. It is a synthetic, high-gloss polymeric finish—a lacquer—but it dries in 5 min to touch and is hard in 30 min. *Finishes and Coatings Division, Magnus Chemical Company, Dept. RLC, South ave., Garwood, N.J.*

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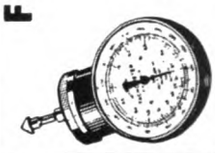
Speed Measuring Instruments

. . . to meet every requirement
Write for Bulletin 35-X



JAMES G. BIDDLE CO.
Electrical & Scientific Instruments
1316 ARCH STREET, PHILADELPHIA 7, PA.

BE SURE YOU'RE ON THE RIGHT TRACK
ALWAYS SPECIFY

MEGGER®
Electrical Resistance Measuring Instruments

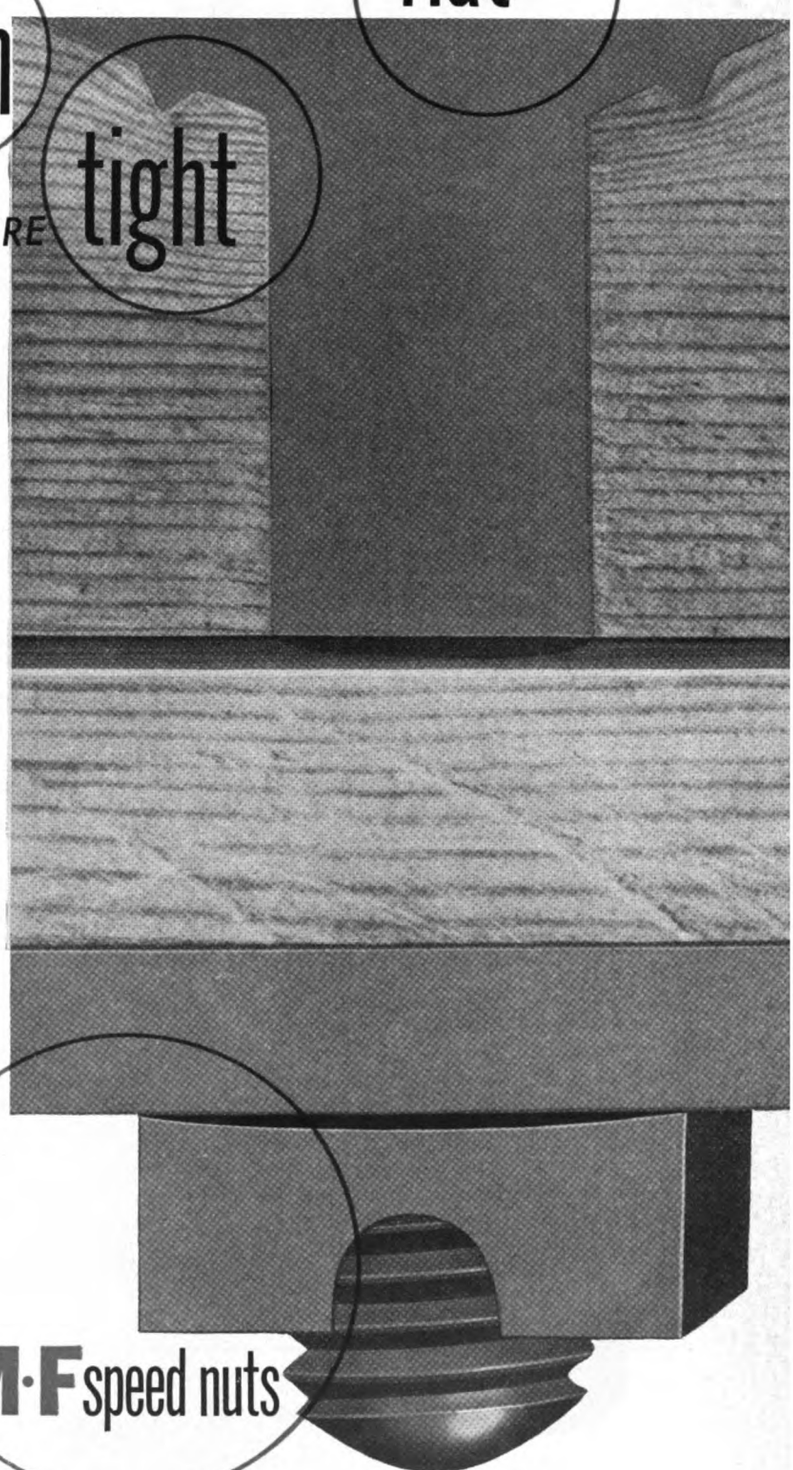
. . . for all electric, Diesel-electric locomotives and other electrical equipment testing requirements.
Write for File RR #1

3 reasons why M·F Water-Tight bolts make *BETTER FLOORS*

mooth ..... *BECAUSE THEY'RE* **flat**

lean.... *BECAUSE THEY'RE* **flush**

ry..... *BECAUSE THEY'RE* **tight**



Shippers want safe delivery, not damage claims. A flat, flush, *dry* surface ensures lading protection. And, because M·F Water-Tight bolts require no countersinking, their added protection costs less to start with!

The M·F Water-tight ring prevents the entrance of moisture and decay, too—educes flooring maintenance.

SAVE LADING . . . SAVE LABOR . . . SAVE FLOORING with *M·F WATER-IGHT BOLTS.*

intenance

BECAUSE THEY'RE LOCKED WITH **M·F speed nuts**

MACLEAN-FOGG LOCK NUT COMPANY
5535 N. Wolcott Ave., Chicago 40, Ill.

In Canada: The Holden Co., Ltd., Montreal

Oakite sends diesel washing costs ...DOWN ...DOWN ...DOWN

... gives you the important advantage ...

low-cost end results

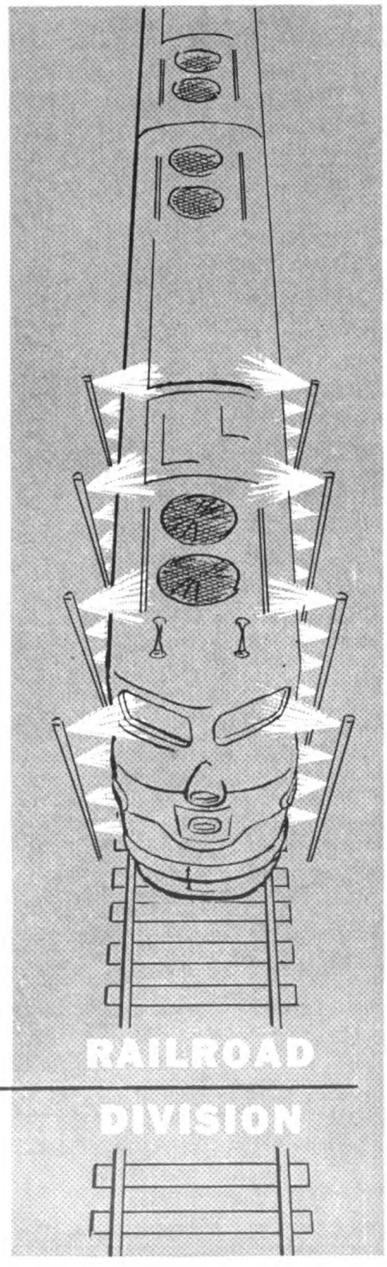
Here's example: One terminal spent $9,600 yearly on "economy" cleaning compounds for washing diesel units. That figured to 80 cents worth of material per unit.

Along came the Oakite man to show that a perfect cleaning job could be done for a material cost of 31¢ per diesel unit ... for a saving estimated at some $5,000 a year.

How? A switch to Oakite Composition No. 72 and Compound No. 88 permitted *more dilute solutions*, and *less gallonage per unit* besides. Less than half the nozzles on the spray washer were utilized with no loss in coverage, less waste of cleaning solution.

In *any* phase of maintenance cleaning, true economy rests not in the original cost per pound of cleaner ... but in the *end results.*

Oakite materials are available for low-cost end results on all types of railroad maintenance cleaning. This manual tells how. It details *methods* as well as materials. Write Oakite Products, Inc., 46 Rector Street, New York 6, N. Y.



SPECIALIZED INDUSTRIAL CLEANING
OAKITE®
MATERIALS · METHODS · SERVICE
SCIENCE

In our 50th year

Personal Mention

(*Continued from page 22*)

ing and mechanical departments. Formerly assistant to president-operations, Chicago & North Western.

Norfolk & Western. *Crewe, Va.:* W. A. Faris appointed master mechanic, Northern Division. *Roanoke, Va.:* W. H. Morris appointed assistant superintendent car department, succeeding Mr. Faris. R. E. Thompson appointed division car inspector, Eastern General Division, succeeding Mr. Morris. *Lamberts Point, Va.:* O. H. Jennings appointed car foreman, succeeding Mr. Thompson; E. H. Keith appointed assistant car foreman, succeeding Mr. Jennings. *Shenandoah, Va.:* J. E. Pettrey appointed foreman, succeeding Mr. Keit Formerly assistant car foreman.

Southern.—*Atlanta, Ga.:* Harry B. Dundon Jr., appointed general foreman. Henderson C. Trollinger, Jr., appointed assistant foreman. *Alexandria, Va.:* James R. Julian appointed general foreman, succeeding Mr Dundon. *Charlotte, N. C.:* Charles M. Joiner appointed general foreman, succeeding Mr Julian. *Memphis, Tenn.:* Robert L. Ponce appointed night enginehouse foreman.

Obituary

A. H. Petersen, superintendent car departme Belt Railway of Chicago, died February 3.

Supply Trade Notes

G. F. Thruelsen

E. T. Plummer

FARR COMPANY.—*Gordon F. Thruel* has been appointed general sales manager, charge of marketing operations for the com mercial/industrial, railroad and electron sales divisions formerly under the direct of R. S. Farr, president.

■

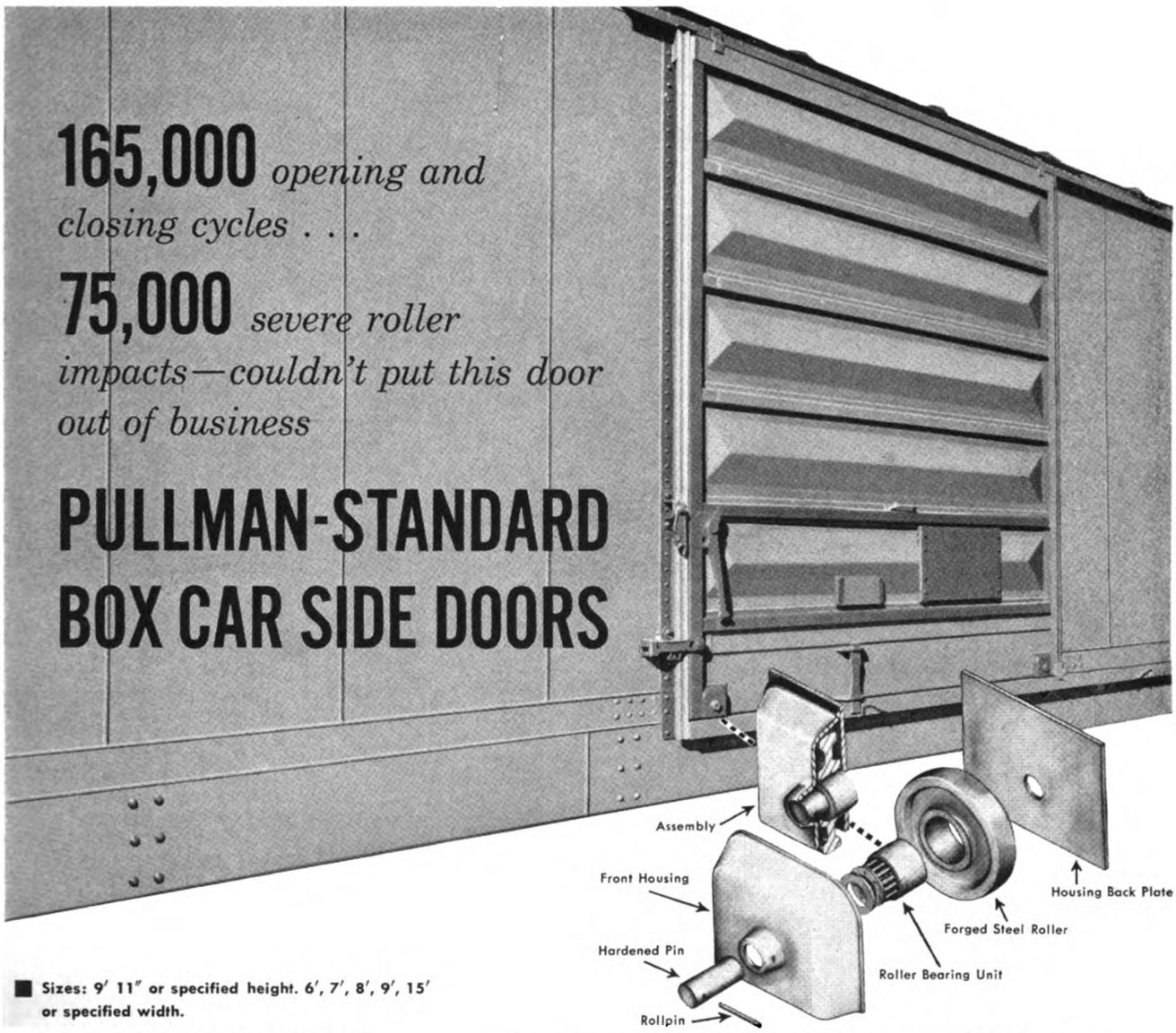
UNION ASBESTOS & RUBBER CO.—*T. Plummer* has been named general s manager of the Fibrous Products Divis Mr. Plummer was previously assistant g eral sales manager at Bloomington, Ill.

(*Turn to page 74*)

165,000 *opening and closing cycles . . .*

75,000 *severe roller impacts—couldn't put this door out of business*

PULLMAN-STANDARD BOX CAR SIDE DOORS



- **Sizes: 9′ 11″ or specified height. 6′, 7′, 8′, 9′, 15′ or specified width.**
- **Heavy-duty lower combination panel and framing member of ½″ corrosion resistant, copper bearing steel to withstand loading dock abuse.**
- **Other panels of .10-inch corrosion-resistant copper-bearing steel. Fixtures of forged or cast steel to withstand service abuse. All parts can be repaired by welding if accident damaged.**
- **5″ rollers with durable cage type roller bearings insure trouble-free, easy operation.**
- **Precision fabricated, embossed for strength.**
- **Corrosion pockets eliminated by welding assembly.**
- **All around sealing arrangement excludes dirt and weather, safeguards lading.**
- **Self-protecting design and fabrication excellence provide for long life, easy maintenance.**

Over nine years ago, Pullman-Standard, the world's largest carbuilder, began the development of the P-S Box Car Side Door. Extensive field research determined the lading protection qualities, durability requirements and minimum maintenance features that shippers and railroads demand. P-S freight car engineering and production specialists applied these performance demands to the design and precision fabrication of this outstanding door now offered America's railroads.

Exhaustive laboratory and in-service tests have proved that the P-S Box Car Side Door exceeds even the rigorous demands that the Great American Railway System must make for top performance. One continuing laboratory test of the door roller mechanism and door track has put the P-S door through 165,000 opening and closing cycles. Another subjected the rollers and bearings to over 75,000 individual heavy impacts. Result: not a damaged bearing, rollers were still "in-round," door track was groove-free and door action remained smooth and easy.

Complete details and specifications on the P-S Box Car Side Door are available from your nearest Pullman-Standard Sales Office or by writing to the address below.

WORLD'S LARGEST BUILDER OF ROLLING STOCK

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

221 N. LA SALLE STREET, CHICAGO 1, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO

CONVECTAIR

"It Warms the Man First"

REDUCES COST

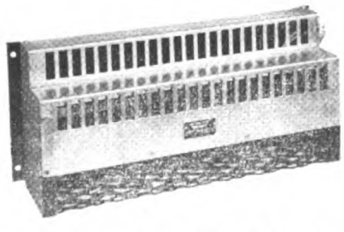
No moving parts. Low first cost. Draftless air and radiant heat keep the crew comfortably warm.

Powered by auxiliary generator —no water piping—no possibility of leaks.

Full heat in below-zero weather —independent of engine water temperature.

Write for information on how leading railroads reduced their operating costs and improved their cab heating.

CONVECTAIR
ELECTRIC HEATER
FOR
LOCOMOTIVE CABS



OGONTZ CONTROLS

COMPANY

8029 YORK ROAD • ELKINS PARK

PHILADELPHIA 17, PA.

Supply Trade Notes

(*Continued from page 72*)

K. W. BATTERY COMPANY.—*Trojan Battery Company*, 724 East 61st st., Los Angeles, Cal., has been appointed sales representative for KW in the Southern California area, Arizona and part of Nevada.

■

FARRELL MANUFACTURING COMPANY.—The *Stanley H. Smith Company*, Cleveland; *Ralph W. Payne Company*, Washington, D. C.; *Eastern Railway Supplies, Inc.*, New York, and the *Harbil Company*, Chicago, have been appointed sales representatives for a mobile diesel refueler built by Farrell.

■

OAKITE PRODUCTS, INC.—*John A. Bonifazio* has been appointed technical service representative at New York.

■

NATIONAL MALLEABLE & STEEL CASTING CO.—*Carter Kissell* has been elected president, succeeding *Cleve H. Pomeroy*, who has been named chairman of the board of directors. Mr. Kissell has been the company's legal counsel since 1941.

■

E. I. du PONT de NEMOURS & CO., FINISHES DIVISION.—*J. E. Lowe* has been appointed assistant regional industrial sales manager, Chicago Region.

■

MORRISON RAILWAY SUPPLY CORPORATION.—*Kenneth E. Templin* has been appointed eastern representative of the Morrison Metalweld Process. Mr. Templin will contact and service railroads, industrial plants, etc., in the mid-atlantic area, with headquarters in Wyomissing, Pa.

■

FAIRBANKS, MORSE & Co.—*James G. Graham*, general manager, Railroad Division, Chicago, has been appointed manager of the Los Angeles sales and service branch, succeeding *Paul A. Suess*, retired.

■

BLACK & DECKER MANUFACTURING Co.—*George W. McCarty* has been elected vice-president—research and development.

■

DUFF-NORTON COMPANY.—*Robert J. Beck* has been appointed assistant chief engineer, Jack Division. Mr. Beck was formerly with the Westinghouse Electric Corporation.

■

ALPHA-MOLYKOTE CORPORATION.—*Dow Corning Silicones, Ltd.*, of Toronto, Ont., has been appointed Canadian distributor for Alpha-Molykote.

■

NORTH AMERICAN CAR CORPORATION.—*Major General Edmund C. R. Lasher* has been appointed to an executive position at North American and is expected to be named president and chief executive officer after the company's annual meeting in April. As president, Gen. Lasher will succeed *L. H. S. Roblee*, who will serve as vice-chairman of the board until retirement January 1959. Gen. Lasher, a graduate of West Point, class of 1929, was formerly assistant chief of the Army Transportation Corp. He retired from the army on January 31.

J. E. Duff

F. W. Segerstrom

S. Fesus

JOY MANUFACTURING COMPANY—*James E. Duff* has been appointed general sales manager of the Electrical Products Division in St. Louis, Mo.

■

L. O. F. GLASS FIBERS COMPANY—*Fred W. Segerstrom* has been appointed general sales manager of the industrial division. Mr. Segerstrom was previously general sales manager of the general products division.

■

UNITED STATES RAILWAY EQUIPMENT COMPANY.—*Sam Fesus* has been appointed assistant vice-president, with headquarters at 231 S. La Salle street, Chicago. Mr. Fesus, who was formerly superintendent of car shops of the Shicago & North Western, will assist railroads in obtaining freight car requirements, either by direct purchase or lease.

■

KAISER ALUMINUM & CHEMICAL SALES, INC.—*G. J. Weihofen* has been appointed head of the railroad department, succeeding *A. J. Ringholm*, who has been named assistant product manager, extrustions.

■

DANA CORPORATION. — *William Pautke* has been apointed a sales engineer, Toledo. Mr. Pautke was formerly a district field engineer for Fairbanks, Morse & Co.

■

LINDE COMPANY, DIVISION OF UNION CARBIDE CORPORATION.—*Robert H. Bent*, Southwestern Region manager of engineering service, has been named assistant manager, Railroad Department.

■

UNION TANK CAR COMPANY.—The Tank, which recently acquired the *Tank & Manufacturing Co.*, East Chicago, Ind., and *Phoenix Manufacturing Co.*

(*Continued on page 76*)

USG® BRUSH GRADES AY 32 AND 2306

service proved for diesel main generators

USG Brush Grades AY 32 and 2306 have proved their high performance in main generators on Diesel-electric locomotives in every type of service. Because of longer life USG Brushes actually reduce down time due to generator overhaul. Brush replacement as well as commutator wear is held to a minimum. A performance test on your equipment will prove that USG Brushes will give you superior commutation and longer service life. Only USG Brushes have Statite® . . . the permanent shunt connection that cannot be pulled out or jarred loose. Statite retains its original low millivolt shunt drop. Now's the time to try USG Brush Grades AY 32 and 2306 with Statite connections that have never failed in millions of miles of railroad service! Why not order today?

Send for the latest USG Brush Catalog B-56 and the new USG Brush Grade List, both are excellent for designing or for specific applications.

223

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW 13, MICHIGAN

COST-SAVING SUGGESTION ON DIESEL BRUSHES

Unless commutator maintenance is figured as an integral part of diesel-electric brush costs, the result may be an entirely inaccurate slant on the relative efficiency of various brush grades.

Obviously, commutators that have been bar-burned by improper brushes cost more to recondition (and may even have to be reconditioned oftener) than those requiring only normal periodic maintenance.

Our suggestion, then, is this: *Over a span of, say, 600,000 miles, test Stackpole Brushes against any grades you may now be using.* Add costs for as many brush sets as may be needed to *overhaul costs on the commutators involved . . . and compare the results.*

Then you'll have convincing proof of what we mean when we say: "Stackpole Brushes help keep diesel-electrics rolling . . . p-r-o-f-i-t-a-b-l-y!"

Your nearest Stackpole field engineer will gladly help you in arranging such a test.

STACKPOLE
diesel-electric
BRUSHES

FOR MAXIMUM MILEAGE CONSISTENT WITH SMOOTH, BURN-FREE COMMUTATION

STACKPOLE CARBON COMPANY, ST. MARYS, PA.

Supply Trade Names

(*Continued from page 76*)

Joilet, Ill., has added as a wholly owned division, the *Graver Water Conditioning Company,* specialists in equipment design and processes in water and liquid treatment fields.

■

GENERAL MOTORS CORPORATION, ELECTRO-MOTIVE DIVISION.— *J. G. Cronin* and *M. C. Warren,* former district sales representatives in the eastern region at New York, have been promoted to district sales managers, eastern region.

■

KERITE COMPANY.—*Ralph B. Norton,* assistant chief engineer, has been appointed chief engineer, succeeding Alan S. Dana, who recently was appointed consulting engineer for the company.

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

PROTECTIVE COATINGS. 36-page manual (Form No. 257) features color chips of 102 different protective coating items and includes sections on methods of surface preparation, use of primers, finish coatings, and the availability of special coatings where required. The coatings include primers, short and long oil type coatings, heat and chemical resistant coatings, floor coatings, Galvinoleum coatings, etc. (Write: *Rust-Oleum Corporation,* Dept. RLC, 2799 Oakton st., Evanston, Ill.)

CABOOSE CARS. 12-page booklet contains exterior and interior views and floor plans of International bay-window, cupola, extended cupola, and transfer type caboose cars. Principal dimensions given. (Write: *International Railway Car Company,* Dept. RLC, Rand Bldg., Buffalo 3.)

CHROMIUM PLATING CYLINDER LINERS. 4-page "Mecrome Liner Bulletin" illustrates wide variety of sizes and types of cylinder liners now being plated with Mecrome and how rigid inspection and quality control techniques help obtain uniformity in Mecrome liners. (Write : *Metal Finishers, Inc.,* 1725 East 27th st., Dept. RLC, Cleveland 14.)

HELIWELDING. 24-page revised Catalog 2300 lists manual, semi-automatic, automatic and accessory Heliweld equipment for welding stainless steels, aluminum, copper and copper-base alloys, and other metals. (Write: *Air Reduction Sales Company, a division of Air Reduction Company,* 150 East 42nd st., New York 17.)

COVERED HOPPER CAR. 8-page bulletin describes Greenville GV-2 covered hopper car. Contains complete specifications for the

(*Continued on page 78*)

America's foremost engineered lettering tools

designed to reduce your present costs 50 to 80%

Used today by 1/3rd of the Nation's leading Railroads . .

DN

Spray it®

STENCILS

PRESSURE SENSITIVE TYPES

Easy to apply. No skill required. Produces the most accurate and durable type of lettering, numerals, medallion, and other types of markings. Adds long life to your identification or advertising on all your equipment . . .

Whatever your lettering problems may be regarding identification, advertising, reflective or non-reflective, the DEMP-NOCK LETTERING SYSTEMS can help you get the job done in less time.

For additional information write Dept. RR-100

THE DEMP·NOCK COMPANY

21433 MOUND ROAD • VAN DYKE, MICHIGAN • U.S.A.

DEMP NOCK®

Have YOU tried the low toxicity-high flash CLEANER . . . ?

F.O.-128

FINE ORGANICS 'SAFE-TEE' SOLVENTS

Ask your friends.
Undoubtedly many now use F. O. – 128!

35 ROADS USE FOR DIESEL ELECTRIC EQPT.

- *20 times safer* than carbon tetrachloride!
- No significant residue on drying!
- Does *not* attack insulations!
- Non-corrosive. *Safe!* Effective!

F. O. 252 Solvent—Detergent—cleans Diesel engine generators in place. Many other uses. Write Dept. RL-3 for technical data sheets.

FINE ORGANICS, Inc.

211 East 19th Street, New York 3. N. Y.

FOR MEN ON THE MOVE... in a hurry

TOLEDO®

DROP HEAD RATCHET TOOLS

Furnished in three sizes, from ⅛" to 2" capacity, the TOLEDO Drop Head Pipe Threader offers light, handy threaders for all-round work. Ideal for close corners, tiresome overhead threading, wherever time means money. Thousands of these handy threading tools attest to their value and popularity. Dies are changed in seconds by simply pulling a pawl—the die drops out. Slip in another and you are ready to go. If you haven't tried the TOLEDO Ratchet Threader, see one at your supply house . . . next trip.

THE TOLEDO PIPE THREADING MACHINE CO.
Toledo 4, Ohio

Send for Bulletin No. 4

BUILT RIGHT—PRICED RIGHT

No. 22 VISE

For quality at a low, low price the TOLEDO 22 is best. Solid, dependable, timesaving . . . its Acme threads insure long wear. For a more positive grip, use the TOLEDO 25. Its five jaws eliminate any torque slippage. ⅛" to 4½" capacity. Both are typical TOLEDO quality tools.

BUILDERS OF THE WORLD'S FINEST PIPE TOOLS

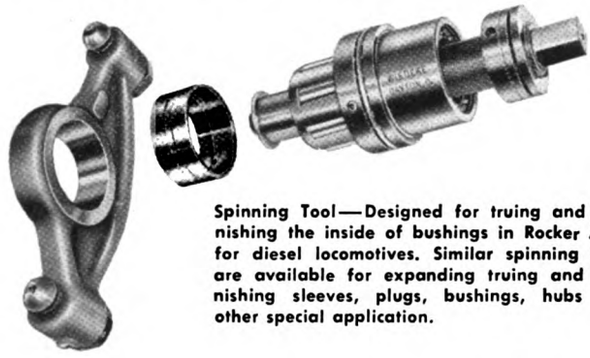
TOLEDO®

PIPE THREADERS • PIPE WRENCHES • PIPE MACHINES

WIEDEKE

THE QUALITY NAME IN TUBE EXPANDERS . . . SINCE 1892

Spinning Tools for Diesel Maintenance



Spinning Tool—Designed for truing and burnishing the inside of bushings in Rocker Arms for diesel locomotives. Similar spinning tools are available for expanding truing and burnishing sleeves, plugs, bushings, hubs and other special application.

Wiedeke IDEAL Expanders are designed to roll both ends of sleeve parallel in cylinder head. Expanders for upper end have shoulder or collar to position Tube Expander while rolling. Expander for lower end passes through sleeve and automatically positions itself for rolling. Write for *new* General Catalog 81.

for upper end of Sleeve in Cylinder Head—Style 1A

for lower end of Sleeve in Cylinder Head—Style 1B

#40

The Gustav WIEDEKE Company
Dayton 1, Ohio

THREE LOCOMOTIVES in California Rendezvous

...all equipped with SPRAGUE *AIR-Push* Windshield Wipers!

Locomotives of three railroads approaching camera on parallel tracks in Los Angeles recently in observance of "Invest in America Week." They are (from left) Southern Pacific, Union Pacific, and Santa Fe. All three are equipped with Sprague Air-Push Windshield Wiping Equipment, as are 95% of all modern diesel locomotives!

Sprague DEVICES, INC.
MICHIGAN CITY, INDIANA

Helps From Manufacturers

(*Continued from page* 76)

car, a general arrangement drawing, and basic specifications on Greenville's three other package cars—flat, gondola, and triple hopper. (Write: *Greenville Steel Car Company*, Dept. RLC, Greenville, Pa.)

HEAVY DUTY LUBRICANT. Bulletin No. 114 discusses general properties and illustrates typical industrial and mobile equipment uses of Molykote, Type BR-2, lubricant packaged in cartridges and applied from a grease gun. (Write: *Alpha-Molykote Corporation*, Dept. RLC, Stamford, Conn.)

MATERIALS HANDLING EQUIPMENT. Looseleaf catalog illustrates and describes automatic tongs, motorized tongs, motorized rotating hooks, "C" hooks and other hook applications, sheet lifters, forged crane hooks, etc., for lifting loads of any size, shape, or weight. (Write: *Heppenstall Company, Materials Handling Division*, Dept. RLC, New Brighton, Pa.)

RIDE-STABILIZER UNIT. 4-page Bulletin No.16-B illustrates and describes features, ride characteristics, and components of the new Style RS-2 Ride Stabilizer for existing freight-car trucks. (Write: *Holland Company*, Dept. RLC, 332 S. Michigan ave., Chicago.)

DRILL JIG BUSHINGS. Catalog 35875 lists complete line of A.S.A. and Ex-Cell-O Standard drill jig bushings. (Write: *El-Cell-O Corporation*, Dept. RLC, 1200 Oakman Blvd., Detroit 32.)

"DUCTILE IRON DIGEST". 18-page booklet describes new metal as strong as carbon steel . . . tensile strength up to 200,000 psi. Has as much as 30 per cent elongation, and Charpy impact values range from 15-115. Case records show how strength and toughness can be cast in tiny levers and huge engine frames. (Write: *Reader Service Section, International Nickel Company*, 67 Wall st., New York 5.)

TESTING FACILITIES. 16-page booklet describes and illustrates testing facilities for research and development, involving metals and metal structures (Write: *Budd Company*, Dept. RLC, 2450 Hunting Park ave., Philadelphia 32.)

QUCK COUPLING ASSEMBLIES. 8-page Catalog F-10-R gives complete information on OPW-Jordan Kamlok Quick Couplers for use on hoses, piping and equipment. Contains dimensional drawings, pressure-temperature ratings, and chemical service recommendation chart. (Write: *Jordan Industrial Sales Division, OPW Corporation*, Dept. RLC, 6013 Wiehe Road, Cincinnati 13.)

FIRELESS STEAM CLEANER. Two-page bulletin (P-7578) describes Kelite fireless steam cleaner, its steam gun features and how it uses live steam from existing steam supply. Table of specifications and a list of optional equipment given. (Write: *Kelite Corporation*, Dept. RLC, 81 Industrial Road, Berkley Heights, N.J.)

GRINDING MACHINE ATTACHMENTS. 12-page Publication No. G-701 first general catalog of standard attachments for Cincinnati center-type, roll, and centerless grinding machines. (Write: *Cincinnati Milling Machine Company*, Dept. RLC, Cincinnati 9.

ennsylvania Checks s Lube Oil

ontinued from page 37)

original sample, a further double raction is made with benzene. Both d and oxidized lubricating oil are able in benzene and this procedure oves the oxidized oil products. This ans that only dirt is left after the zene extractions. Subtracting the from the figure determined by the tane extraction gives the quantity of dized oil products. If either exceeds -half of 1 per cent, the PRR test partment requests an oil filter and oil nge, including a flushing of the nkcase. If the dirt is excessive, air ers are changed and the air boxes aned. There may be an inspection for ton blowby and for leaks in the en- e air system. If there is undue dation, the oil cooler by-passes are cked along with the temperature con- ls while the engine is operated under l load.

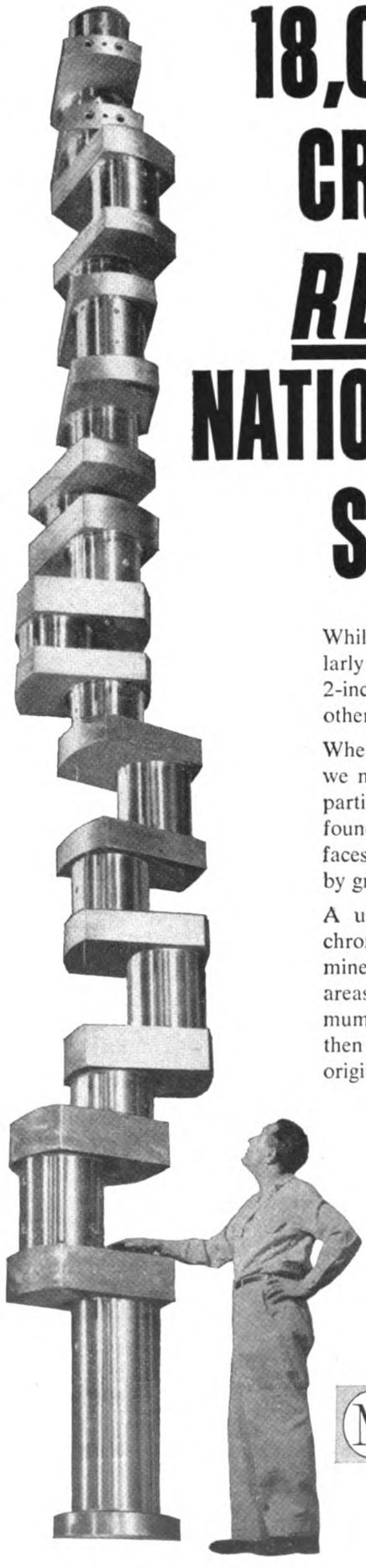
gine Cleanliness

Cleanliness of the engine interior is intained with the aid of the deter- nt-dispersive additives in the oil. ese substances disperse dirt and car- n and hold them in suspension in the . These dispersed particles will not posit on engine parts. However, both rmal service and unusual conditions se a gradual decline in the ability the additives to hold materials in spension. The laboratory runs a "pH" t which measures the acidity or calinity of the oil. Heavy duty deter- nt oils are usually alkaline when new d become acidic after being acted on by the products formed by fuel mbustion.

At one time the PRR also made an h determination to indicate the rela- e amount of additives present. Pure ineral oils are completely consumed nen heated to about 1,000 deg F. etals used in the chemical additives not burn. The ash is no longer de- rmined for this purpose because the H" and pentane insoluble tests have en found to yield the information. ne PRR relies on periodic oil changes maintain effective additive levels in diesel crankcases. Regular laboratory ecks then guarantee that no unusual nditions will cause lacquering or dging in an engine.

The Test Department summarizes the

(Continued on page 80)



18,000 POUND CRANKSHAFT *REBUILT* BY NATIONAL FORGE SPECIALISTS

While National Forge specializes particularly in locomotive crankshafts, this 23-foot 2-inch compressor crankshaft was just another routine reconditioning job.

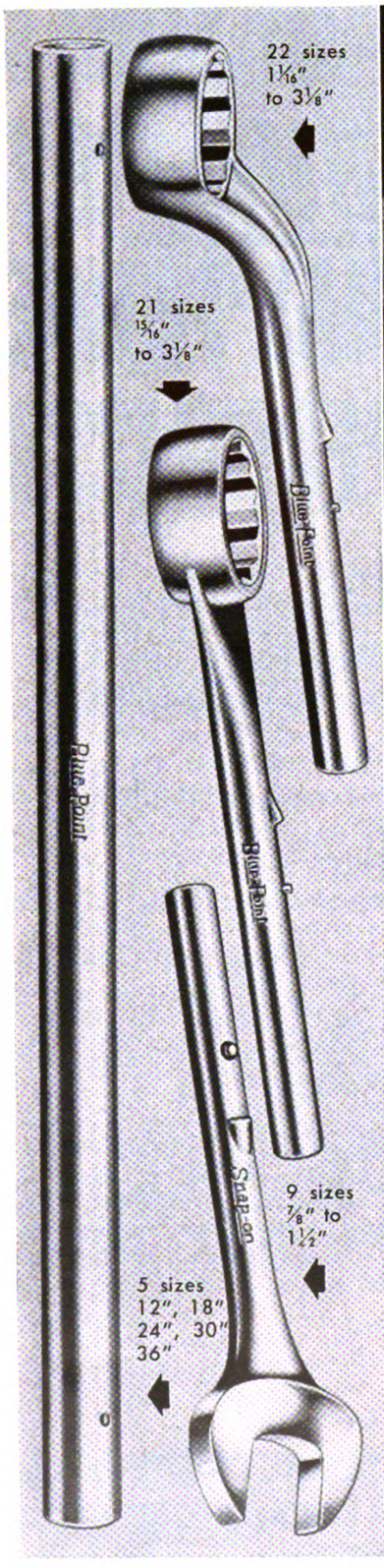
When this shaft arrived at National Forge, we made a thorough visual and magnetic particle inspection. After the shaft was found to be salvageable, all the bearing surfaces were prepared for chromium plating by grinding and grit blasting.

A unique plating machine deposits the chrome uniformly smooth to a pre-determined thickness—and away from fillet areas. After re-grinding—held to a minimum by accurate plating—the shaft was then finished ground and polished to the original specifications.

No other plating company has National Forge's experience in handling both new and rebuilt crankshafts. So, why not try National Forge Specialists on your next crankshaft rebuilding job?

NATIONAL FORGE & ORDNANCE COMPANY
IRVINE, WARREN COUNTY, PA.

52 interchangeable heads — up to 3½ feet of safe, nut-turning leverage



Snap-on

HEAVY-DUTY BOXOCKET® OPEN-END WRENCHES

Quick on size change, handy in tight spots, long on power — these *Snap-on* tubular handle Boxocket and open-end wrenches can "pour it on" when nuts and bolts are *weathered tight.*

There's built-in speed because the mechanic has his choice of wrench head — Boxocket, offset Boxocket or open-end to reach nuts in spots with different clearance problems. Also, with handle off, the heads can run loose nuts up or down quickly Double-hex Boxocket broaching permits a short turning arc where free swing is restricted.

Extension handle and wrench head button-lock in place — can't come apart accidentally — a big safety feature for work crews.

Get the full story on these and many other *Snap-on* railroad tools and tool sets. Your *Snap-on* railroad specialist is equipped to give you fast, personalized service. Write for special railroad literature.

SNAP-ON TOOLS
CORPORATION
Railroad Division
8130-C 28th Avenue • Kenosha, Wisconsin

(*Continued from page 79*)

results of the reports made to terminals showing the frequency with which laboratory-reported defects are located. This entire operation—chemical, physical and spectrographic testing—can produce good results only when it is treated as a cooperative venture between the test and maintenance groups. Engine terminals have not all shown the same ability to locate troubles when they are reported. In fact, it has been this, not the type of diesel engine, which has caused the greatest variation in failing to find defects. The first 18 months of the program showed the following results for the entire system:

Defect	Reports written	Defects found after being reported
Water leaks . . .	1,683	1,038
Bearing examination . .	691	538
Oxidized oil . . .	240	62

The results from reports indicating dirty oil are not shown in terms of defects found; they are shown in terms of reports per diesel engine month. The first 18 months of the program covered 18,353 diesel engine months and yielded 195 reports of dirty engine oil. Dirty oil reflects the quality of engine air filter maintenance and engine performance.

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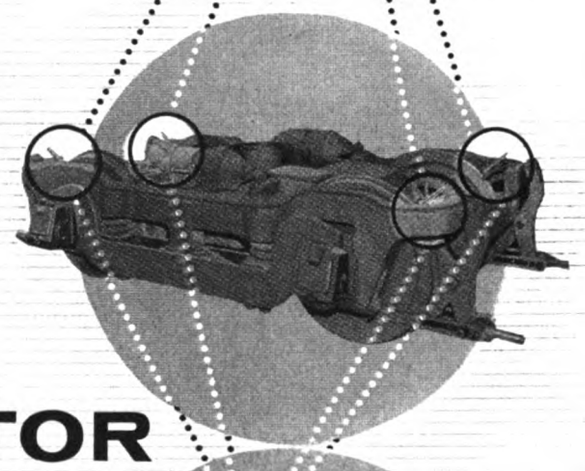

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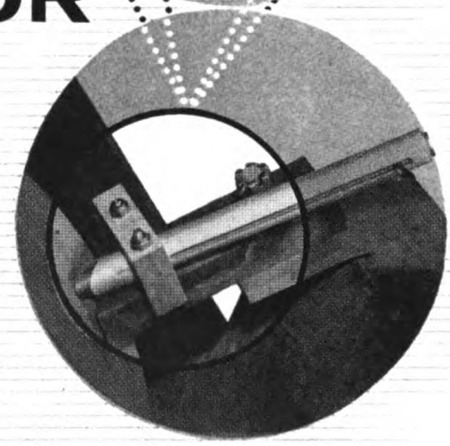

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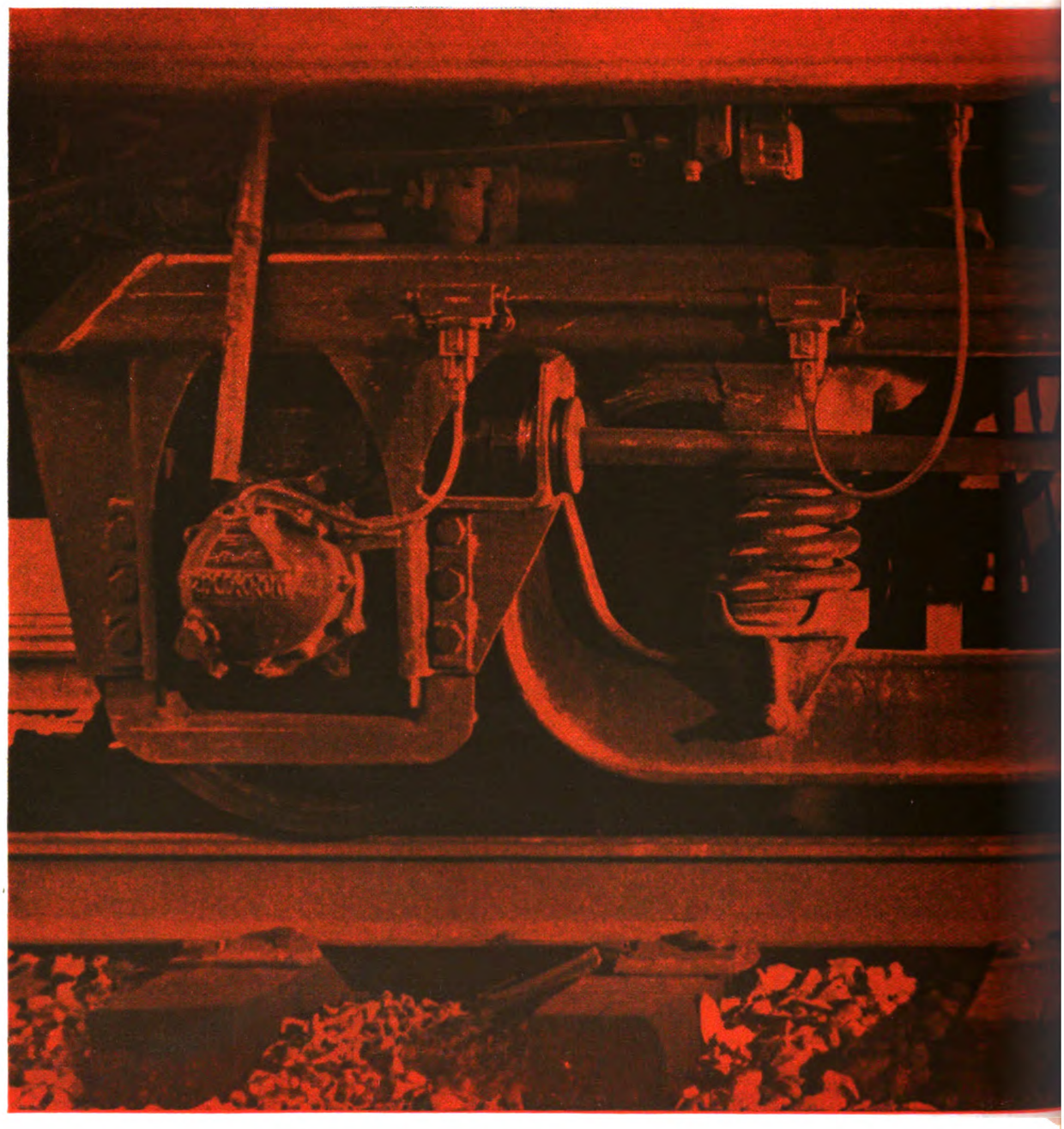

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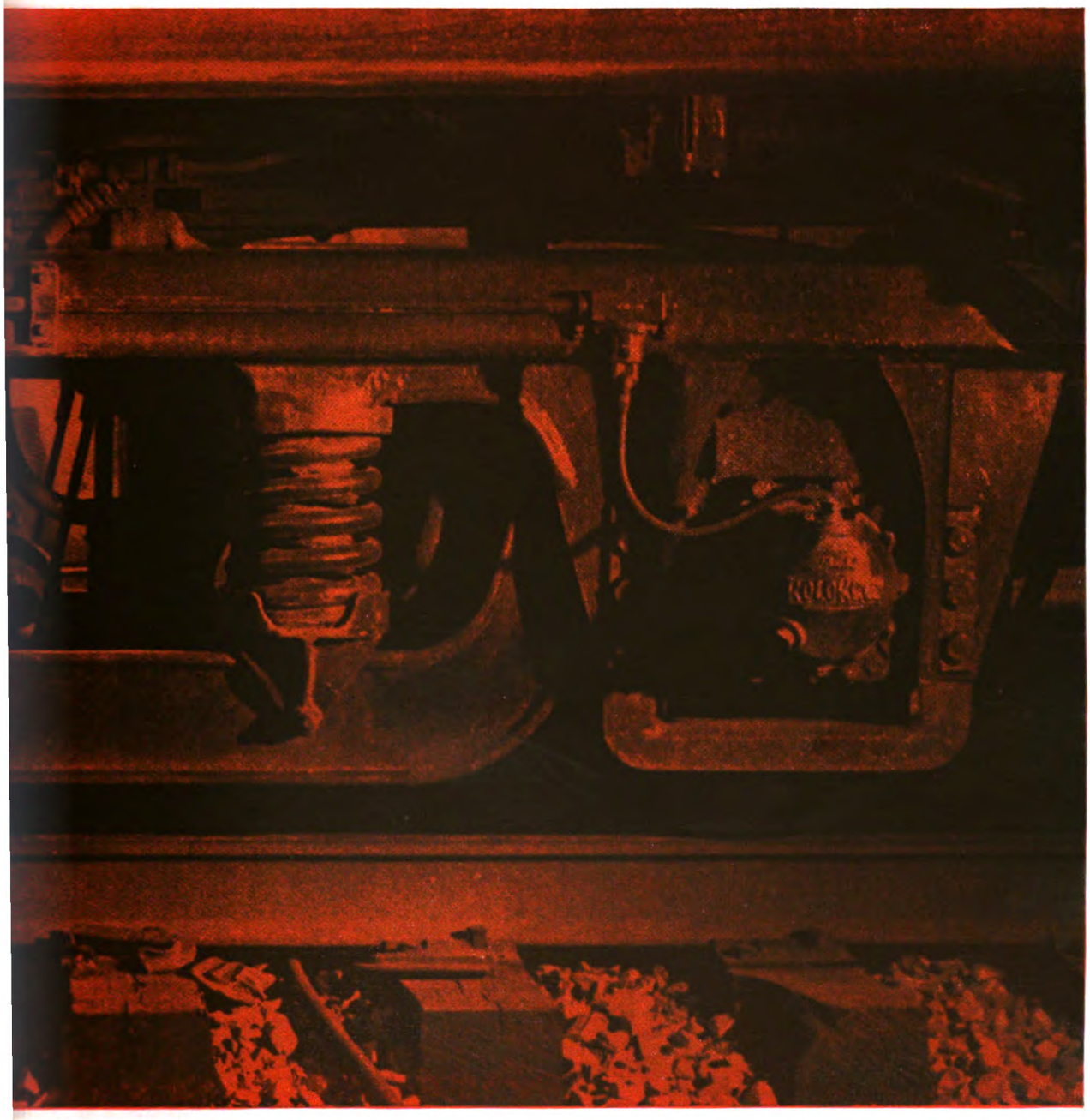

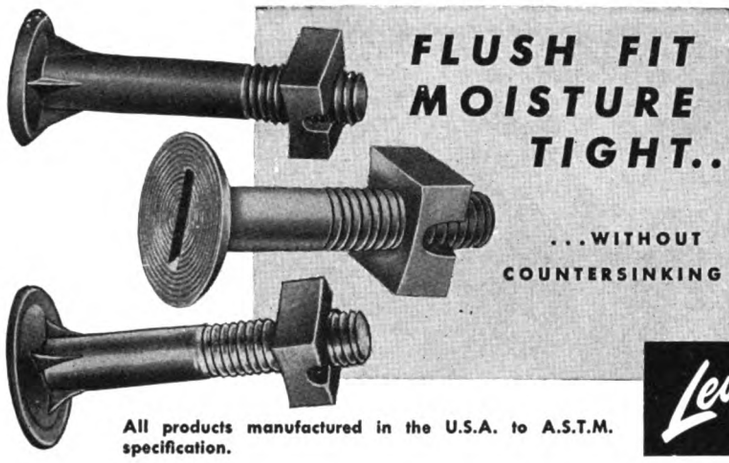

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Adams & Westlake Company 4
Aeroquip Corporation, Marman Div. 70
Air-Maze Corp. 42B
Airaterra (Roylyn Inc.) 62
American Brake Shoe Company, Railroad Products Division 12, 13
American Steel Foundries 48, 49
Armco Steel Corporation 23

Bethlehem Steel Company 10
Biddle Co., James G. 70
Broderick & Bascom Rope Co. 47
Buckeye Steel Castings Co., The .. Inside Back Cover

Dana Corporation 42
Dayton Rubber Co. 26, 27
Demp-Nock Co. 77
Duff-Norton Company 66
DuPont De Nemours & Co., E. I., Grasselli Chem. Dept. 55

Elastic Stop Nut Corporation of America 57
Electro-Motive Division, General Motors 24, 25, 44, 45
Esso Standard Oil Company 65
Exide Industrial Division- Electric Storage Battery Co., The 59

Fine Organics, Inc. 77

Griffin Wheel Company 8, 9
Gulf Oil Corporation 82, 83

International Steel Company 52, 53

Joy Monufacturing Company 15

Lewis Bolt & Nut Company 84

MacLean-Fogg Lock Nut Company 71
Magnus Chemical Co., Inc. 51
Magnus Metal Corporation 28, 61
Marman Division, Aeroquip Corp. 70
Miller Lubricator Co. 19
Miner, Inc., W. H. 6

National Aluminate Corporation 81
National Carbon Company, Division of Union Carbide Corporation 11
National Electric Coil Company 3
National Forge & Ordnance Co. 79
National Malleable & Steel Castings Company 67

Oakite Products, Inc. 72
Ogontz Controls Co. 74

Pullman-Standard Car Manufacturing Company 16, 17, 73

Schundler & Co., Inc., F. E. 64
Security Railway Products 69
Snap-on Tools Corporation 80
Sprague Devices, Inc. 78
Stackpole Carbon Company 76
Standard Railway Equipment Manufacturing Company 63
Stratoflex, Inc. 68

Texas Company ..... Inside Front Cover
Timken Roller Bearing Company, The .... Back Cover
Toledo Pipe Threading Machine Co., The 77

Union Carbide Corporation, National Carbon Co. Div. 11
United States Graphite Company 75

Westinghouse Air Brake Company 20, 21
Wiedeke Company, Gustav 78
Wine Railway Appliance Co., The 41

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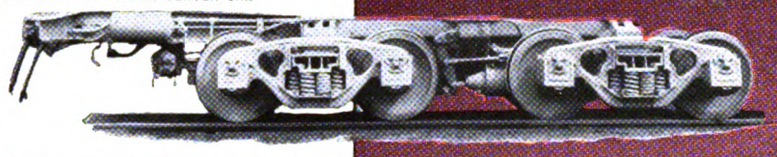

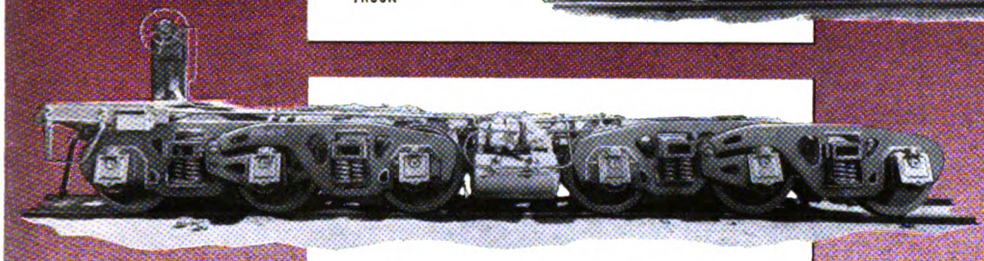

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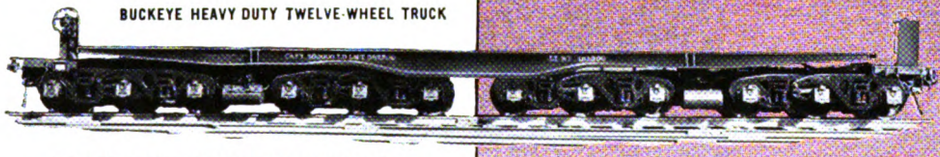

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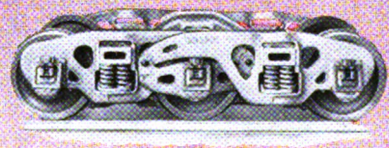

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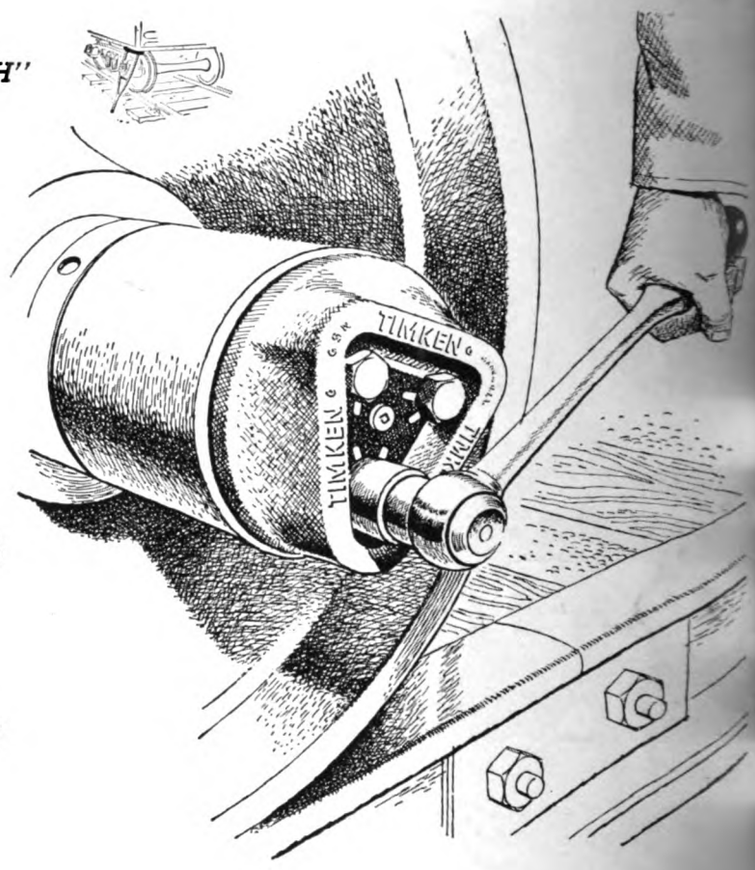
...and they pay for themselves over and over and over in operating and maintenance savings



USE of "crutches"—devices attempting to improve friction bearing performance—will never answer the hot box problem. The one sure *cure* is Timken® tapered roller bearings, because they eliminate the *cause* of hot boxes—the friction bearing itself.

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With Timken bearings, you also slash the cost of bearing inspection and lubrication. Costs that hang on even with crutch devices. Timken bearings cut terminal bearing inspection time by 90%, reduce lubricant costs as much as 95%. The fact is, the new Timken heavy-duty type AP (All-Purpose) bearing assembly will go three years without the addition of lubricant. When all railroads go "Roller Freight", they'll save an estimated $224 million a year, earn about a 22% net annual return on the investment.

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And to be sure of the quality of Timken bearings from melt shop to final bearing inspection, we make our own steel. We're America's only bearing manufacturer that does.

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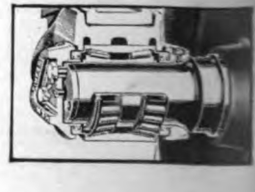
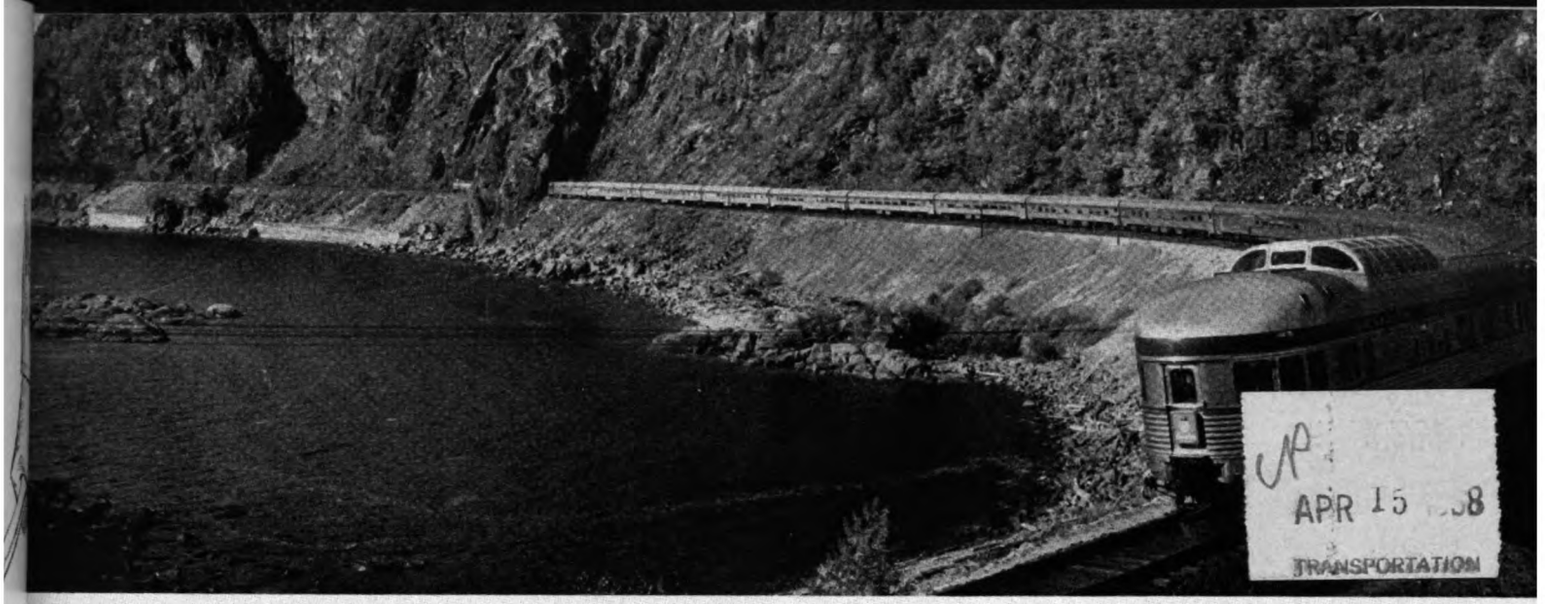
Instead of trying to shore up friction bearings with costly "crutches", *cure* the hot box problem and gain maximum savings in operating and maintenance costs with Timken bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable: "TIMROSCO".

Only TIMKEN® bearings cure the hot box problem and cut operating and maintenance costs to a minimum




APR 15 1958
TRANSPORTATION

How CPR Checked Wheel Wear on This Train . . . Page 27

LWAY LOCOMOTIVES AND CARS

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Burlington Reconditions Power Assemblies for These Engines . . . Page 32

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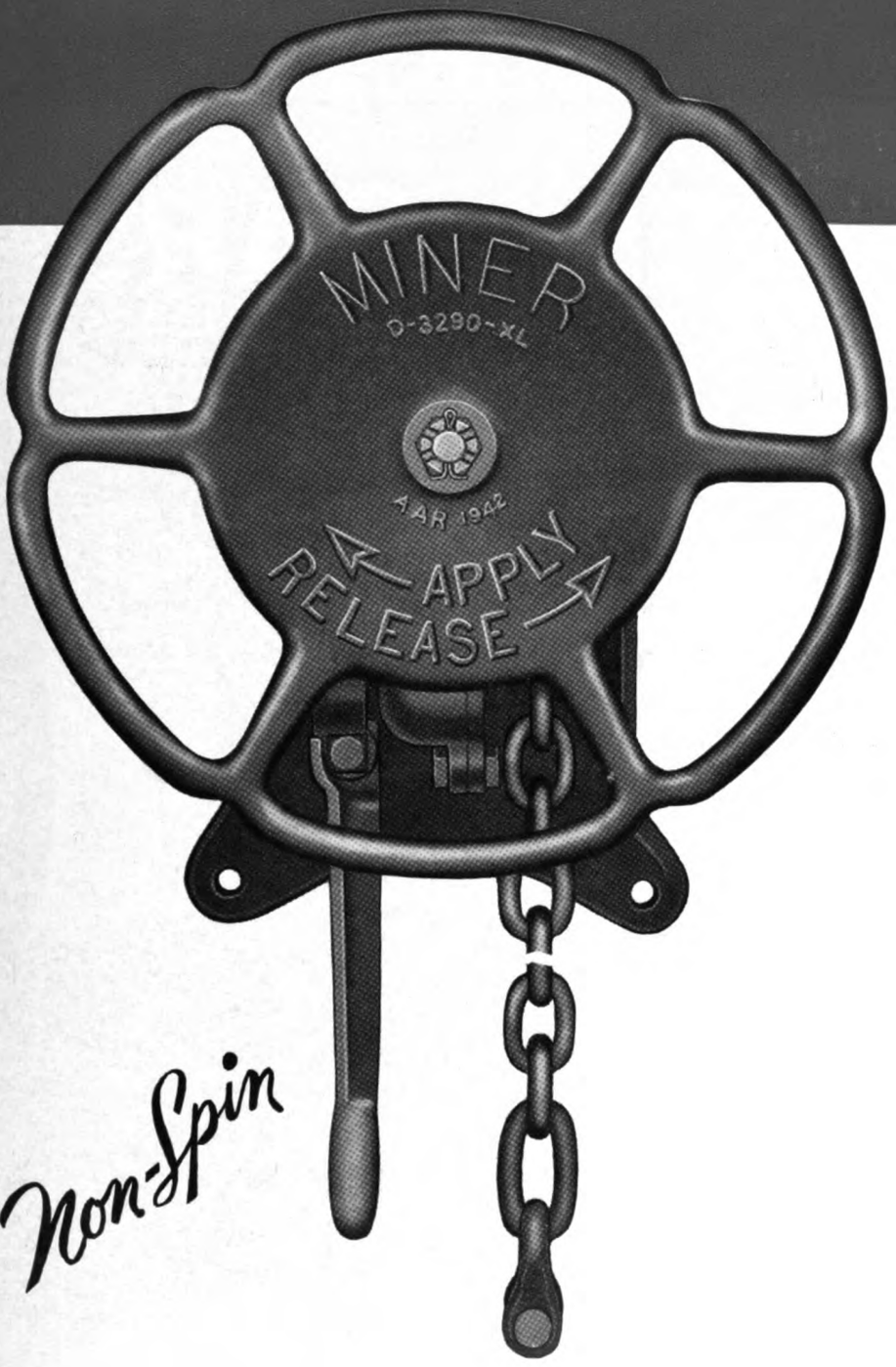

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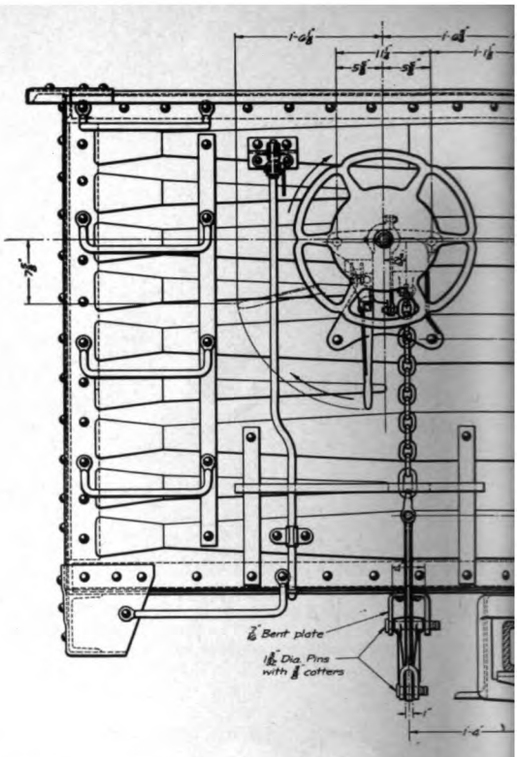

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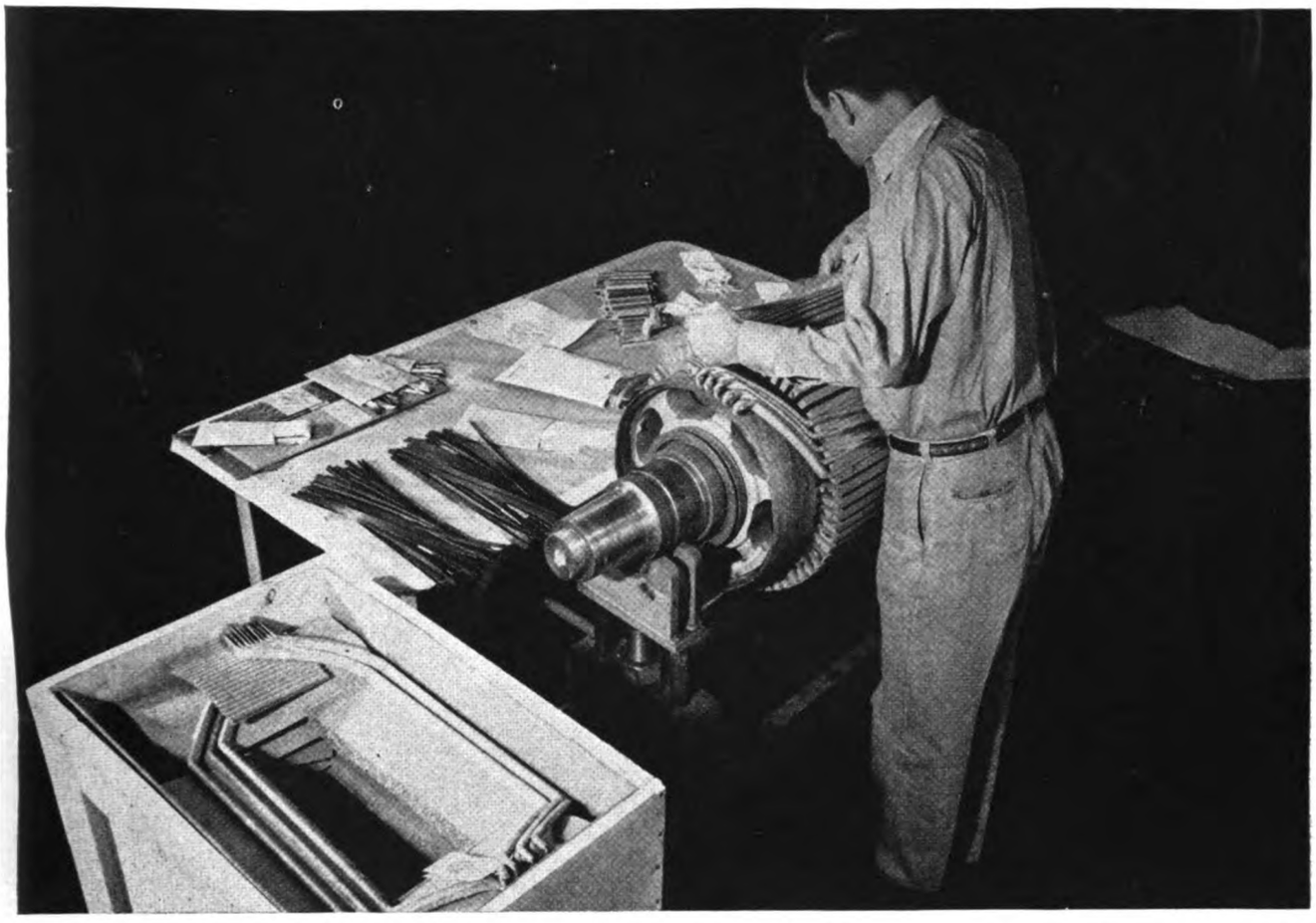

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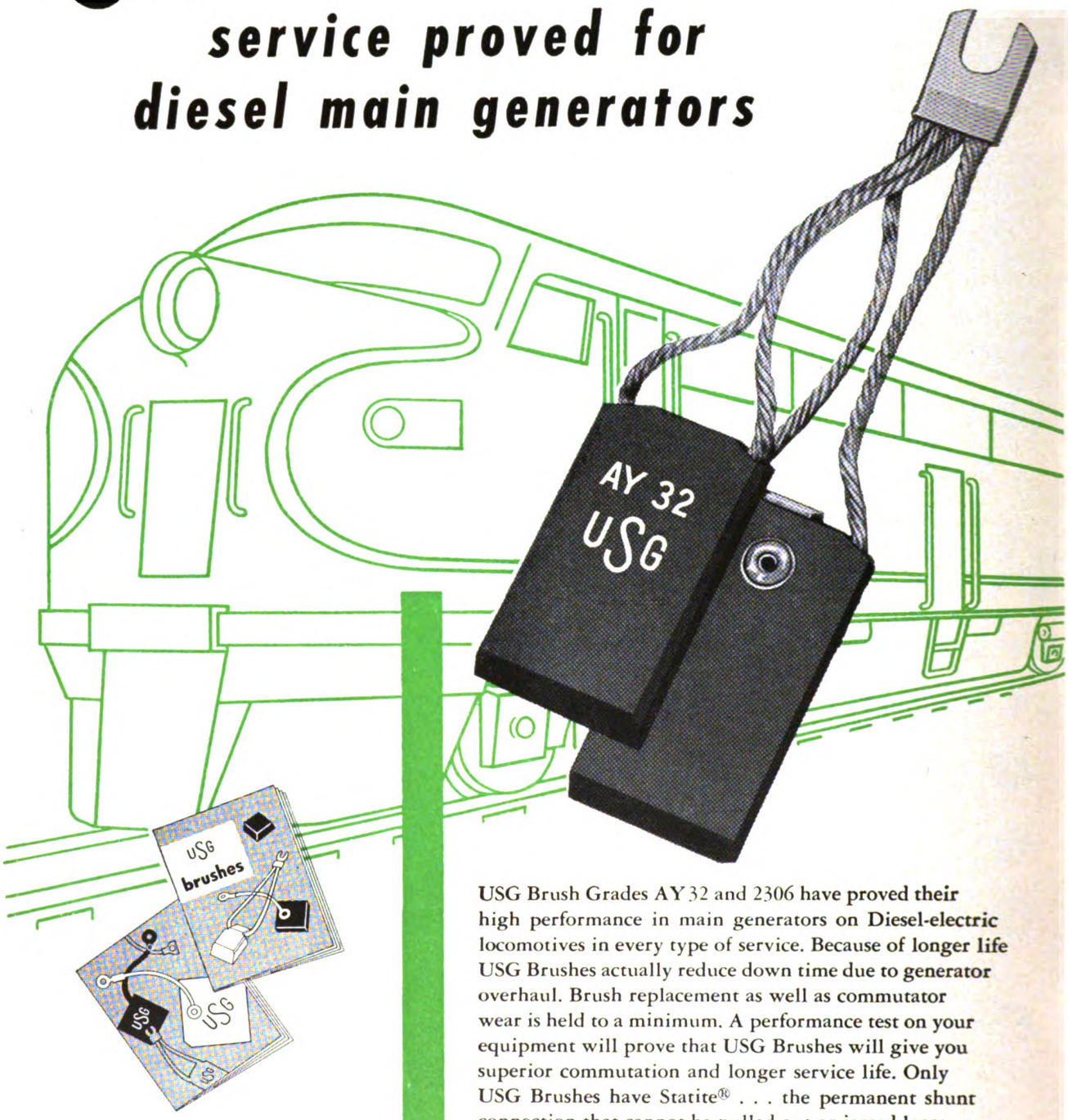

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TIME-SAVING IDEAS FOR

APRIL 1958

Volume 132 • No. 4

MOTIVE POWER AND CAR

CPR Proves AAR and Budd Were Right 27

Extensive records established in conjunction with a preventive maintenance program for 173 new cars enabled this Canadian road to determine wheel life accurately.

Northern Pacific Now Has 'Pig Palace' Cars 30

Shuttered, steel-sided construction of these double-deck stock cars is to reduce losses and to simplify their cleaning and maintenance.

Power Assembly Overhaul Is One-Level Operation 32

Burlington has established real production lines for the reconditioning of liners, pistons, heads and connecting rods for its diesel engines.

Goals of Virginian's Hopper Design 35

This Pocahontas road has incorporated lessons learned through the operation of thousands of hopper cars in its newest design.

Slumbercoach: 40-Passenger Room Sleeper 42

Burlington and Baltimore & Ohio already operate these coach sleepers: more roads may be doing so soon. Biggest innovation is their prefabricated rooms.

DS-24-M Pressure Maintaining Brake Valve 45

The eighth installment in this series on the 24-RL locomotive air brake equipment continues discussion of the newest brake valves.

ELECTRICAL

M-G Regulator Is Highly Efficient 50

Lamp regulator, developed by the Erie Railroad and now manufactured by General Electric, eliminates power loss associated with external resistor used in earlier models.

How Much Do You Know About Brushes 54

In concluding his series of articles on brushes, Mr. Matz offers some pertinent thoughts to those who use and maintain graphite brushes, and emphasizes particularly the fact that most commutation trouble is caused by dirt.

The Engine Ran Without Fuel 54

From which it would appear that the increasing price of fuel would be of no concern to railroads operating such locomotives.

Roll Them Out Like New — Part 8 56

The success of any operation including the overhaul of traction motors requires that no injury be done in the process, and that fits and alignments be checked with great care.

DEPARTMENTS

What's New in Equipment 8
Report 14
Personal Mention 74
Supply Trade Notes 74
Helps from Manufacturers 77

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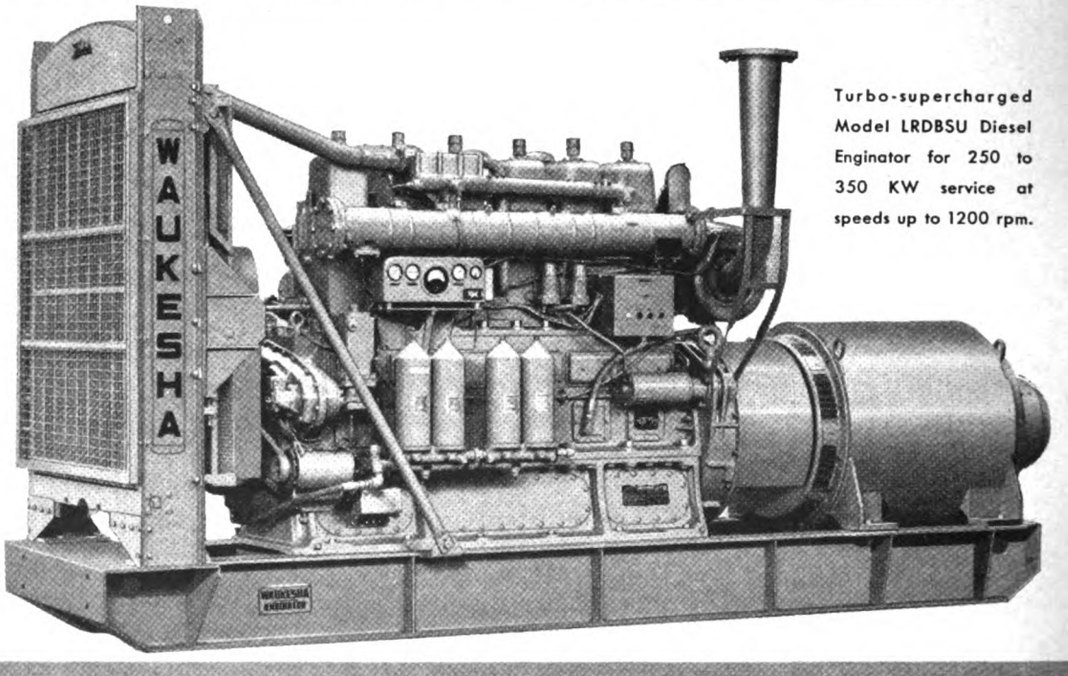

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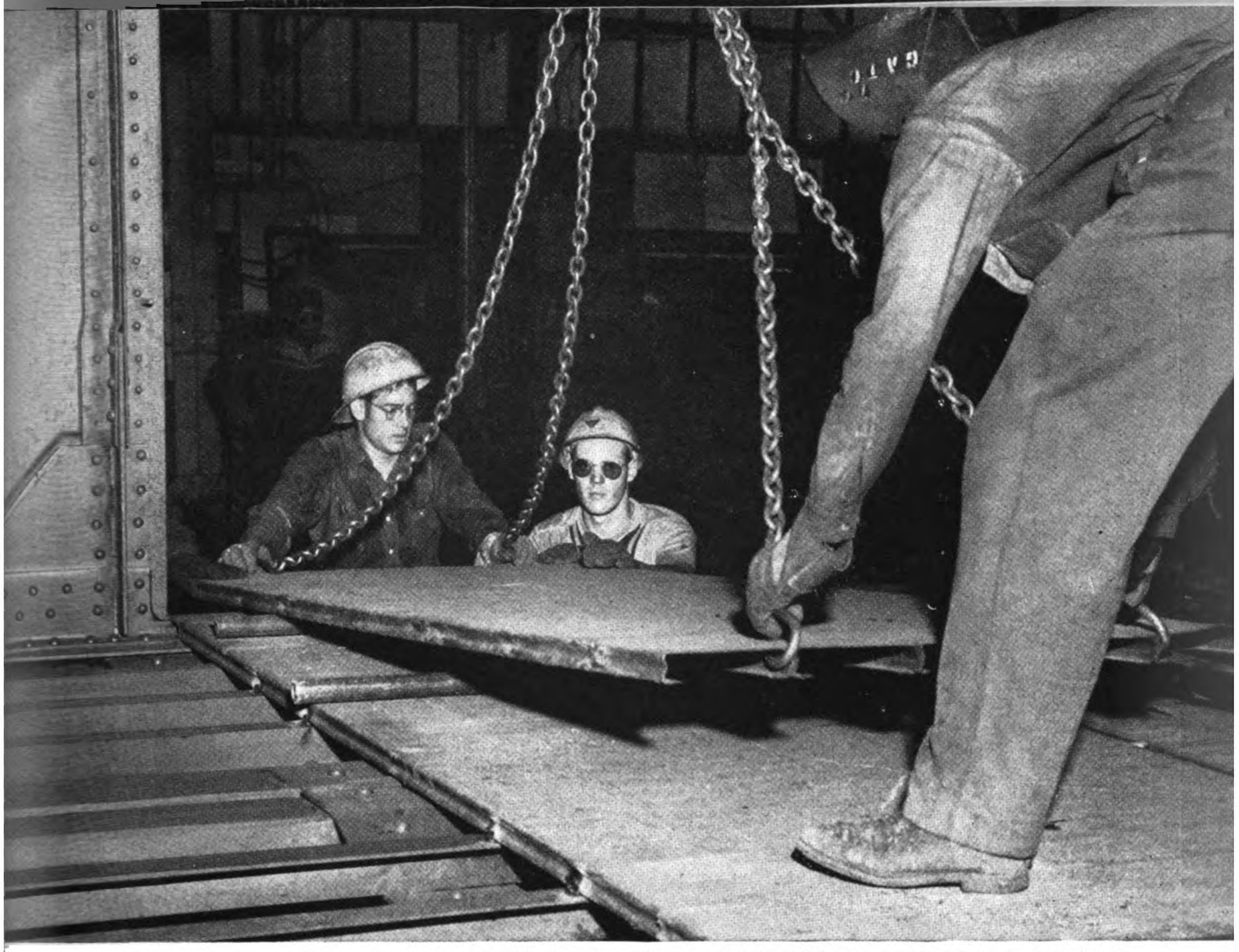

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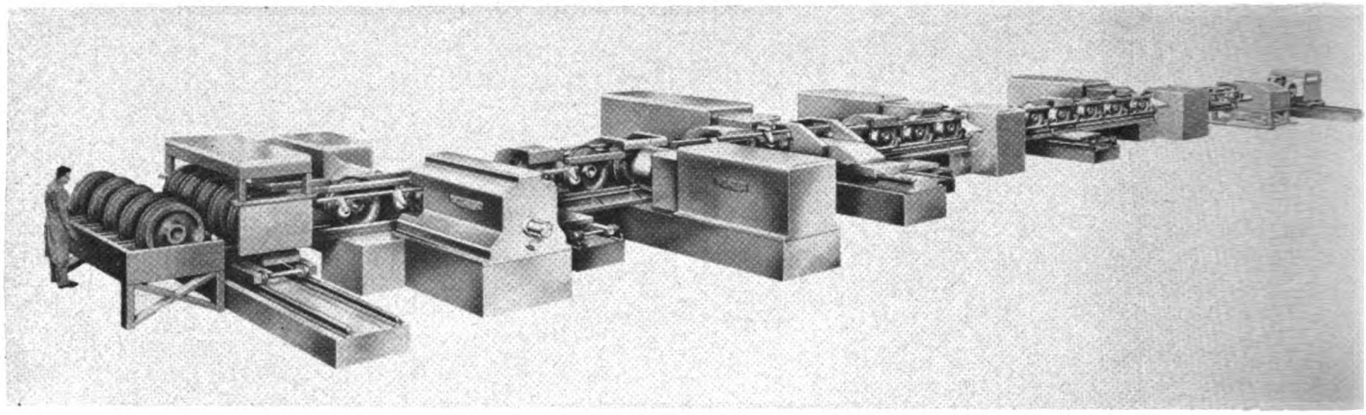


Automatic Car Wheel Machining

The first automated, five-machine transfer line which will completely machine railroad car wheels at a rate of one wheel every 90 sec is being designed and built for the Standard Steel Works division of Baldwin-Lima-Hamilton. To be delivered late in 1958, the transfer machine will handle the wheels in a vertical position throughout. Wheels will be automatically transferred from one station to the next, eliminating considerable handling.

Each of the five machines is actually a separate machine tool, interlocked with load, unload, and inspection stations to operate as one machine which will accurately perform the following operations in sequence: (1) loading; (2) rough boring; (3 and 4) facing; (5 and 6) turning; (7) inspection, and (8) unloading. The controls system will allow the entire line to be operated as a single machine or enable each machine and intermediate unit to be operated individually without affecting the rest of the line.

The machine, being manufactured at a cost of about $600,000, will weigh approximately 340,000 lb. It will be 118 ft long, 30 ft wide, and 7 ft high. *Kearney & Trecker, Dept. RLC, 6784 W. National ave., Milwaukee 14*

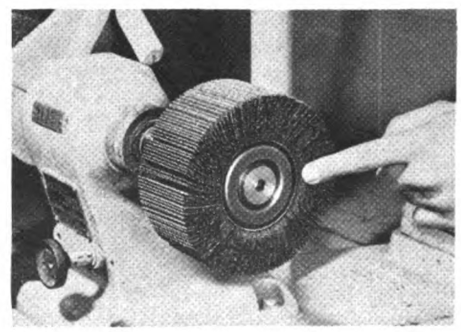
Caboose Power Supply

To meet all contingencies in supplying power to cabooses, a small 3-kw, 40-volt generator with exceptionally wide speed range, is now available. With 33-in. wheels and a 5.28:1 drive ratio, the cut-in speed is 7.6 mph. This corresponds to a generator speed of 412 rpm.

The machine will assume full load at 10.4 mph and will carry it up to 84.2 mph or a generator speed of 4,400 rpm. Regulation is within 3 per cent over the entire speed range.

The generator which is totally enclosed is 15 in. in diameter, 33⅛ in. long and weighs 45 lb less than the previous design made by the same manufacturer. Added features are interpoles for improved commutation and a mechanical pole changer instead of rocking brushes. There are no flexible leads on the pole changer. Bearings are double-shielded and pre-lubricated. There are inside grease caps filled with grease to seal the bearings from external contamination and thus extend bearing life.

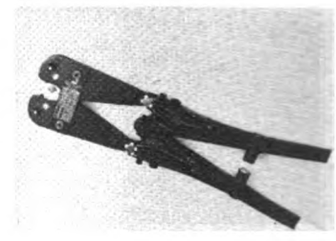
Either belt or gear drive may be used. The mounting and bracket shown may be replaced by a support to be used with a tension suspension for belt drive. *Safety Industries, Inc., Dept. RLC, New Haven, Conn.*



Polishing and Grinding Wheels

These coated abrasive polishing and grinding wheels, designated PG, are for finishing and maintenance operations. They are designed for flush sanding and are equipped with disposable flanges. The flanges, which lock the wheel's abrasive coated leaves securely in place, are factory installed and bonded to the core, making it unnecessary to remove the flanges when a wheel change is required. The flanges provide hub strength not previously available on the PG wheels and eliminate the need for stocking extra flanges.

Flanges and end cap nuts are recessed so that the wheels can be used flush against a surface as in finishing a right angle or corner. Specifications include a standard 1 in. center hole on wheels 6 in. in diameter and a standard 1¾ in. center hole on wheels 7, 8, 9 or 10 in. Wheels 11 in. and larger will continue to use the manfacturer's changeable aluminum flanges. *Minnesota Mining & Manufacturing Co., Dept RLC F7-268, 900 Fauver st., St. Paul 6, Minn.*



Multi-Range Hand Crimping Tool

This multiple range hand tool, Model [illegible] 000, is for crimping A-MP solderless electrical terminals and connectors through

(*Continued on page 65*)

Yellow Strand Braided Safety Slings

You're sure with Yellow Strand Braided Safety Slings on your equipment. These slings combine strength and flexibility to provide safety and ease of handling.

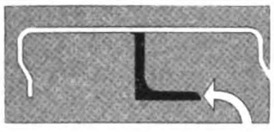
There's a Yellow Strand Sling designed to handle any load on your railroad from a highly polished crankshaft to a Diesel locomotive. Write us today and tell us the size, weight and nature of your problem lift. Our engineers will design a sling to exactly meet your needs! Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.

Yellow Strand® **WIRE ROPE**

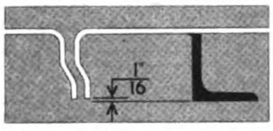
P-S

NAILABLE STEEL FLOOR

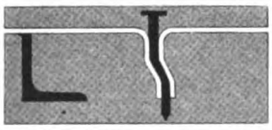
Provides the Smoothest, Strongest Car Floor



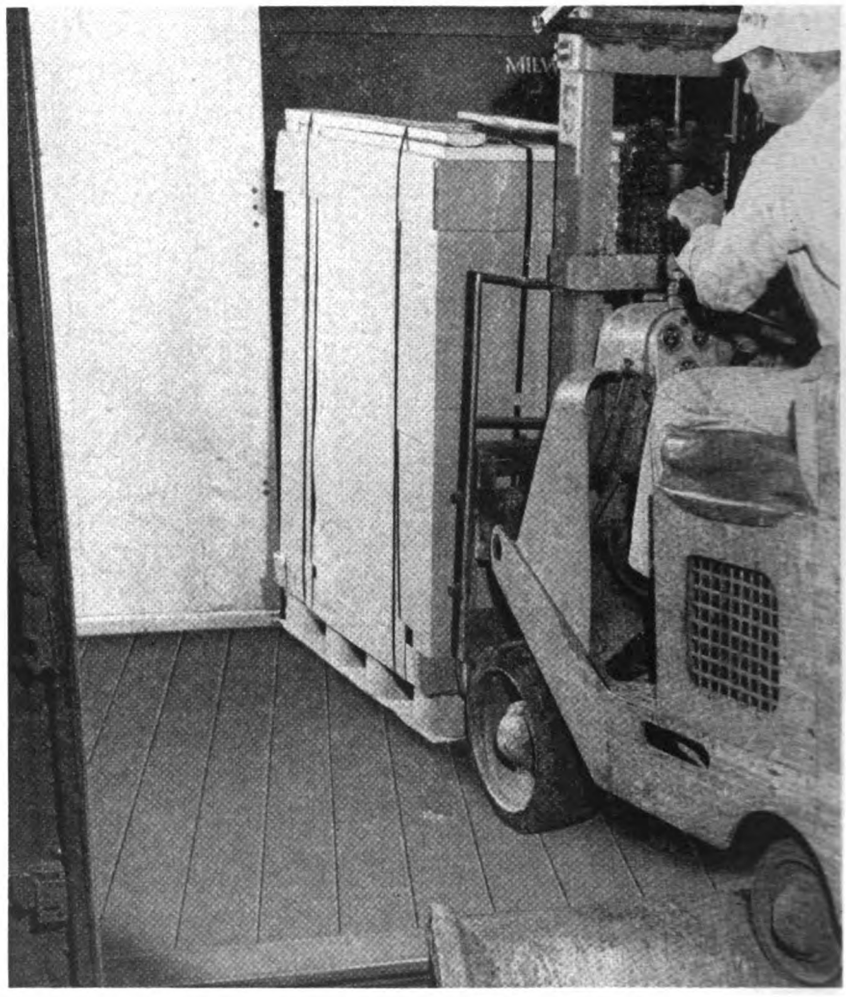
RESISTS CRUSHING AND DISHING—Pullman-Standard design incorporates the use of copper-bearing steel angle as plank support running the full length of each plank. This support gives the P-S floor exceptional strength . . . helps prevent crushing and dishing by heavy loaded lift trucks and racks.



RIDGES CAN'T DEVELOP—P-S design provides a 1/16" underframe clearance at each plank joint. This flexibility prevents planks from offsetting if there is any variation in plank depth. Smooth floor prevents package gouging and allows lift trucks to roll smoothly.



GROOVES CAN'T LOSE NAIL HOLDING POWER—Design of P-S floor prevents nailing grooves from deforming permanently. Grooves retain original holding power on 16d, 20d and 30d nails even after use of 40d nail.



- Section properties of the 10-gauge P-S floor reveal it to be nearly twice as strong as other steel floors.
- P-S Nailable Steel Floor is welded to car underframe on the copper-bearing steel reinforcement angles at plank center away from nailing groove. Welding can not affect groove filler . . . filler can not contaminate weld.
- P-S narrower planks with 6" groove centers provide greater strength and more nailing grooves.
- P-S flexible nailing joint springs back . . . retains original holding power even after use of 30d or 40d nails.

For more detailed information on this outstanding lading protection product . . . for more reasons why you should specify Pullman-Standard Nailable Steel Floor . . . for proof on how it minimizes floor maintenance, provides superior nail holding power and more nailing surface, write to Pullman-Standard or contact your nearest P-S sales office.

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

221 N. LA SALLE STREET, CHICAGO 1, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO

WHY have hot boxes increased 55.8% since 1954?

The A.A.R. figures are accurate and clear! A total of 142,245 hot boxes experienced in the first eight months of 1957 against only 91,277 in the like period of 1954! What's responsible? Lack of proper supervision? Lack of proper maintenance procedures? Poorly renovated thread Packing? Or the multitude of gadgets and pads introduced in those years?

The answer is probably a combination of all these factors. The fact remains, however, that in 1954, when journal boxes were packed with new and renovated thread Packing according to A.A.R. specs, there were almost *51,000 fewer hot boxes* than this year! Think of the savings, had this record been maintained!

There's an even more basic savings to consider. As an example:

2,000,000	Freight cars packed with substitutes such as pads, etc., not yet proved *in service*, @ an average price of about $40.00 per car set	**$ 80,000,000.**
2,000,000	Freight cars packed with approved A.A.R. Journal Box Packing @ approximately $4.90 per car set	**$ 9,800,000.**
	Savings	**$ 70,200,000.**

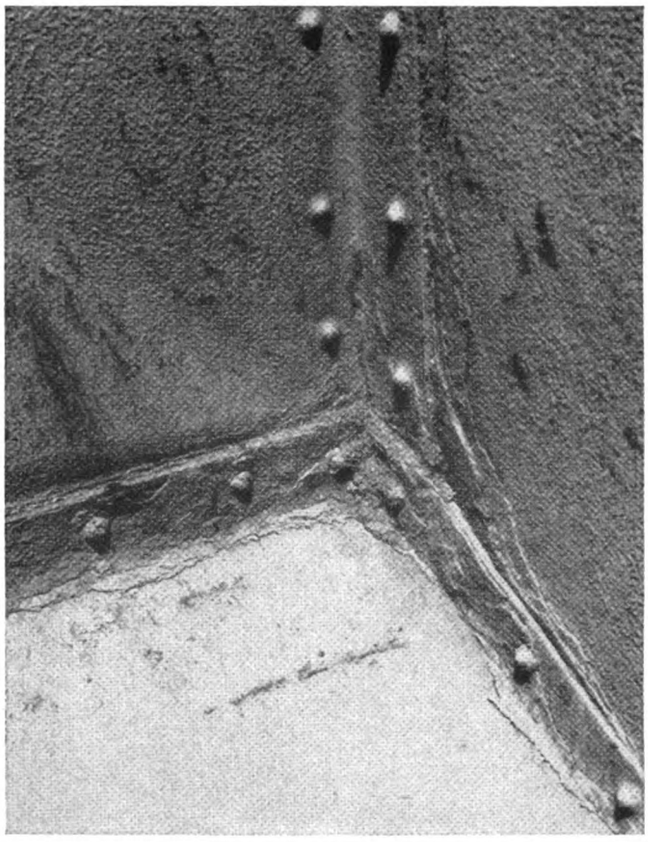
It all adds up to real economy when you stick to tried-and-true measures. In short, there is no economical replacement for A.A.R. Approved Journal Box Packing.

INSTITUTE OF JOURNAL BOX PACKING MANUFACTURED ACCORDING TO A. A. R. SPECIFICATIONS MEMBER THREAD MACHINERS INC.

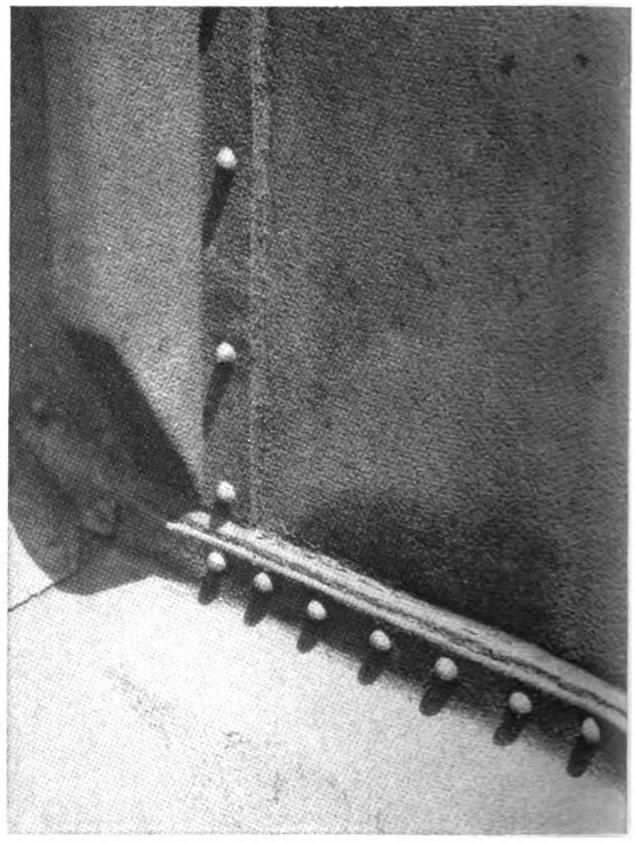
INSTITUTE OF THREAD MACHINERS, INC.

141 East 44th Street, New York 17, New York

Atlas Processing Corp., New York, N. Y.
Meyer Burstein & Sons, Neenah, Wisconsin
Dallas Waste Mills, Dallas, Texas
The J. Milton Hagy Waste Works, Philadelphia, Pa.
John J. McGrath, Inc., Philadelphia, Pa.
National Waste Company, New York, N. Y.
O'Neill Brothers, Inc., Philadelphia, Pa.
The Pittsburgh Waste Co., Inc., Swissvale, Pa.
Riverside Mills, Augusta, Ga.
Royal Manufacturing Company, Perth Amboy, N. J.
Southland Manufacturing Co., Inc., Norfolk, Va.
Twin City Textile Mills Waste Co., St. Paul, Minn.



A copper-bearing steel



A nickel-copper high strength low alloy steel

How Corrosion Research helps lower car maintenance costs

Examine these hopper car interiors. Both have seen ten years of similar service.

Look first at the picture on the left. This is a copper-bearing steel with a good measure of corrosion resistance. Yet notice the rust, the spalling.

Now look at the picture on the right. This is a nickel-copper high strength low alloy steel. All you see is a thin, tightly adherent oxidized surface . . . a surface that protects the base metal, slows the progress of corrosion. This car should provide at least 50% longer life for its owners before it must be repaired.

Inco Corrosion Research at Kure Beach, near Wilmington, N. C. Here, atmospheric corrosion data gathered over many years on thousands of specimens provides answers to one of industry's most urgent problems.

A product of corrosion research

Since 1925, nickel-copper steels have been under study by Inco. The goal: to find low cost alloy steels for car frames and plates with improved corrosion resistance and higher strength . . . and reduce the staggering repair bill caused the industry by corrosion each year.

As one family among a host of corrosion-resisting materials that are improving operating economy throughout industry, nickel-copper steels have done a good job. Cars keep rolling longer, need less shop work, and are lighter, permitting bigger payloads.

If you have a corrosion problem...

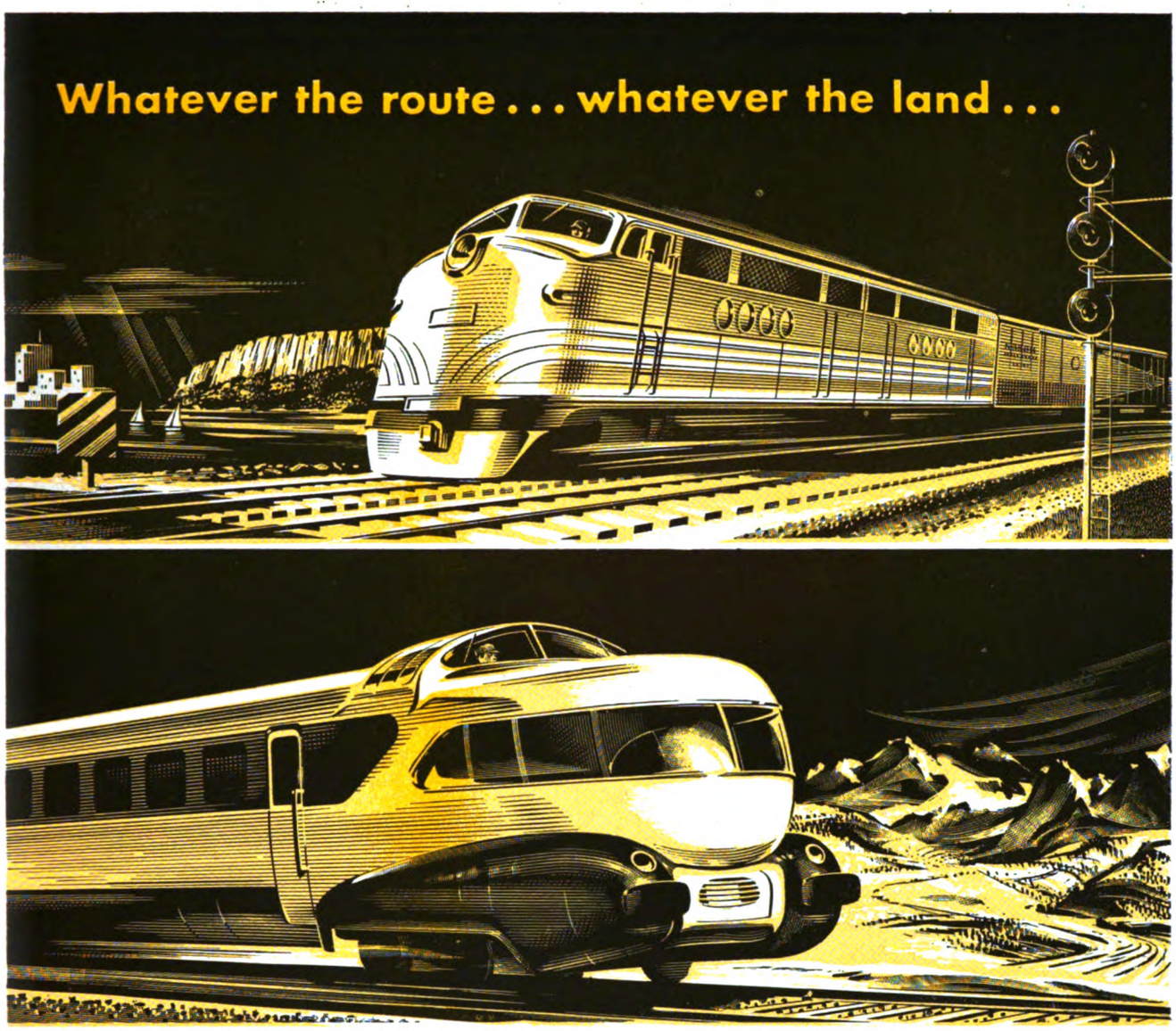
You owe it to yourself to talk with Inco's corrosion engineers. They have gathered data on hundreds of metals, alloys and coatings. It's data that was gathered to help you.

48 Pages of Help: compositions, fabricating and welding characteristics, corrosion resistance and mechanical properties of nickel-copper high strength low alloy steels are discussed in the Inco booklet *"Nickel-Copper High Strength Low Alloy Steels."* Please drop us a card for your copy.

The International Nickel Company, Inc.

67 Wall Street INCO New York 5, N. Y.

INCO NICKEL



Its performance and name are the same around the world

Other Outstanding Shell Industrial Lubricants

Shell Tellus Oils—for closed hydraulic systems
Shell Alvania Grease—multi-purpose industrial grease
Shell Rimula Oils—for heavy-duty diesel engines
Shell Turbo Oils—for utility, industrial and marine turbines
Shell Dromus Oils—soluble cutting oils for high-production metal working
Shell Macoma Oils—for extreme pressure industrial gear lubrication
Shell Voluta Oils—for high-speed quenching with maximum stability

Shell Talona R Oil 40 offers two outstanding reasons for its acceptance as a top-rated diesel-electric locomotive lubricant: (1) It provides superior anti-wear protection. (2) It maintains engine performance at its peak.

Greatly reduced wear on pistons, rings and cylinder liners is assured because of the selected combination of additives used in Talona® R Oil 40. It has high oxidation stability, combined with resistance to corrosion and sludge formation. It prevents ring fouling and provides excellent detergent-dispersant action.

Today—railroad operators abroad can enjoy the same Talona R Oil 40 that domestic carriers rely upon. For complete information, write to Shell Oil Company, 50 West 50th St., New York 20, N. Y., or 100 Bush Street, San Francisco 6, California.

SHELL TALONA R OIL 40

SHELL

LOCOMOTIVES AND CARS REPORT FOR APRIL

Orders and Inquiries for New Equipment

Placed Since the Closing of the March Issue

Freight-Car Orders

Road and builder	No. of cars	Type of car	Cap, tons	Other detail
AMERICAN REFRIGERATOR TRANSIT CO.:				
Pacific Car & Fdry.	300	Beef rail refrigerators	40	Estimated unit cost, $13,500. For July delivery.
ATCHISON, TOPEKA & SANTA FE:				
Company shops	25	Flat	70	——
MINNEAPOLIS, ST. PAUL & SAULT STE MARIE:				
Company shops	1	Flat	250	——
MISSOURI-KANSAS-TEXAS:				
Pullman-Standard	15	Covered hopper	70	Immediate delivery.
NORFOLK & WESTERN:				
American Car & Fdry.	50	Covered hopper	70	Being delivered.
UNION PACIFIC:				
American Car & Fdry.	52	Covered hopper	70	100 cars to be equipped with Timken all-purpose bearing assembly units. Truck side frames to be narrow pedestal type.
Pullman-Standard	48	Covered hopper	70	

C. L. Combes

A. G. Oehler

RL&C Editorial Staff Changes

CHARLES L. COMBES, who since 1948 has been managing editor and, later, editor of the Car Builder's Cyclopedia and the Locomotive Builders' Cyclopedia, on March 1 rejoined the staff of Railway Locomotives and Cars as managing editor and mechanical editor of the Railway Age. During that period he also served as manager of the Book Department of Simmons-Boardman. Mr. Combes is a graduate of Cornell University, having received his degree in mechanical engineering in 1930. His railroad career started on the Delaware & Hudson during the summers of 1923 and 1924 and continued after graduation as a test engineer in the motive power department of that road until 1938. He joined the staff of Railway Age and the then Railway Mechanical Engineer and continued until 1941, at which time he entered military service as an officer in the Coast Artillery and the Ordnance Department until 1945. Since then he has been continuously with Simmons-Boardman.

ALFRED G. OEHLER, who retired on March 31, after 41 years of editorial service with Simmons-Boardman, received his degree of bachelor of science in electrical engineering from the University of Wisconsin in 1911, served two years in the test department of the General Electric Company and later with public utility companies in Wisconsin before starting his railroad career with the Northern Pacific as an electrical foreman. Mr. Oehler came with Simmons-Boardman in 1917 as managing editor of the then Railway Electrical Engineer (later combined with Railway Mechanical Engineer) and electrical editor of Railway Age. Mr. Oehler's association with these publications as electrical engineering editor has carried over the period during which some of the major railroad electrification projects were completed, as well as the more recent period during which the more spectacular railway "electrification" took place as the result of the replacement of steam motive power by the diesel-electric locomotive. Mr. Oehler will continue to maintain contact with the field as a contributing editor for these publications.

Joint ASME-AIEE Railroad Conference

The American Society of Mechanical Engineers and the American Institute of Electrical Engineers will hold a joint Railroad Conference at the Hotel Statler, Cleveland, April 9 and 10. The program for the conference is as follows:

April 9

9 am

Practical Air Filtration for Diesel Locomotives, M. B. Adams, general supervisor diesel engines, Atchison, Topeka & Santa Fe.

Practical and Economic Limitations of Cleaning Operations on Diesel-Electric Locomotives, D. H. Noble, Chicago Rock Island & Pacific, and B. L. Judy, General Electric Co.

An Evaluation of the Effect of Dirt on Diesel-Electric Locomotives, J. W. Horine, electrical engineer, Pennsylvania.

Methods of Improving Utilization of Motive Power, G. T. Bevan, General Electric Co.

2 pm

Field Experience with Electrostatic Pre-

(*Continued on page 18*)

Summary of Monthly Hot Box Reports

Month	Cars set off between terminals with hot boxes: System	Foreign
December 1953	1,581	2,550
December 1954	1,501	2,994
December 1955	1,819	3,774
1956		
January	2,029	4,302
February	2,570	5,611
March	2,517	6,212
April	3,202	6,881
May	4,672	10,903
June	6,777	15,125
July	8,484	16,067
August	9,891	16,892
September	6,834	12,629
October	4,357	8,429
November	2,650	5,560
December	2,256	4,436
1957		
January	3,373	6,121
February	3,272	6,844
March	3,164	6,687
April	3,949	8,447
May	6,580	12,691
June	8,285	16,277
July	10,438	18,819
August	9,662	17,639
September	6,736	12,066
October	4,616	8,050
November	2,839	4,762
December	2,833	3,486

Summary of Annual Hot-Box Reports

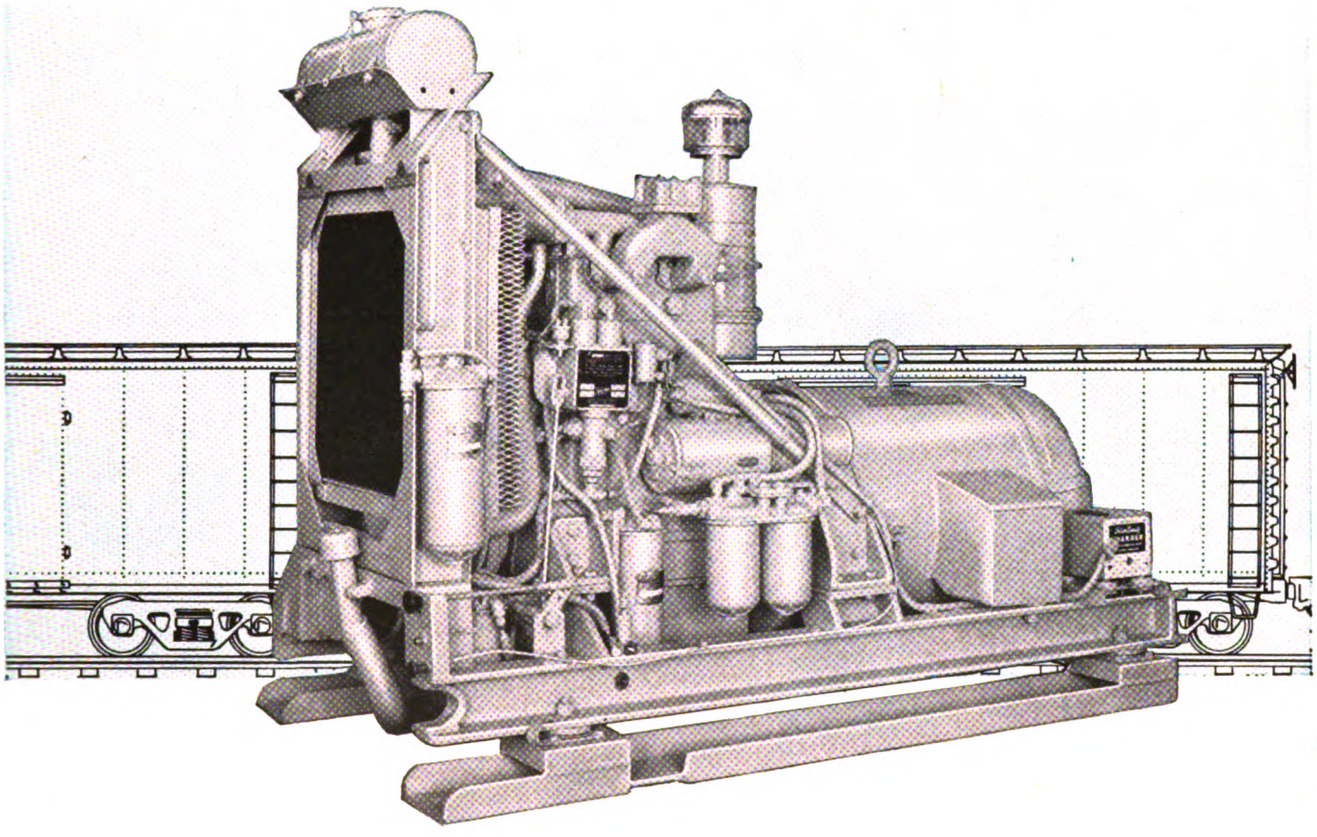
Year	Cars set off between terminals with hot boxes: System	Foreign
1950*	31,183	64,499
1951	60,136	140,940
1952	64,595	115,901
1953	56,328	100,000
1954	53,785	75,058
1955	51,526	90,525
1956	56,239	113,047
1957	65,146	121,890

* July through December 1950 only

COMPACT DEPENDABLE POWER

FAIRBANKS-MORSE Model 45 DIESEL

for Mechanical Refrigerator Cars



. . . Top fuel economy and combustion efficiency over broad range of load conditions.

. . . Rugged design specifically meets severest impact conditions of railroad service.

. . . Extra-large capacity of lubricating oil and cooling water extends range, adds extra margin of safety.

. . . Engine and generator capacity generously meet power requirements of 40-foot or 50-foot cars.

. . . Push-button starting under the most severe cold weather conditions.

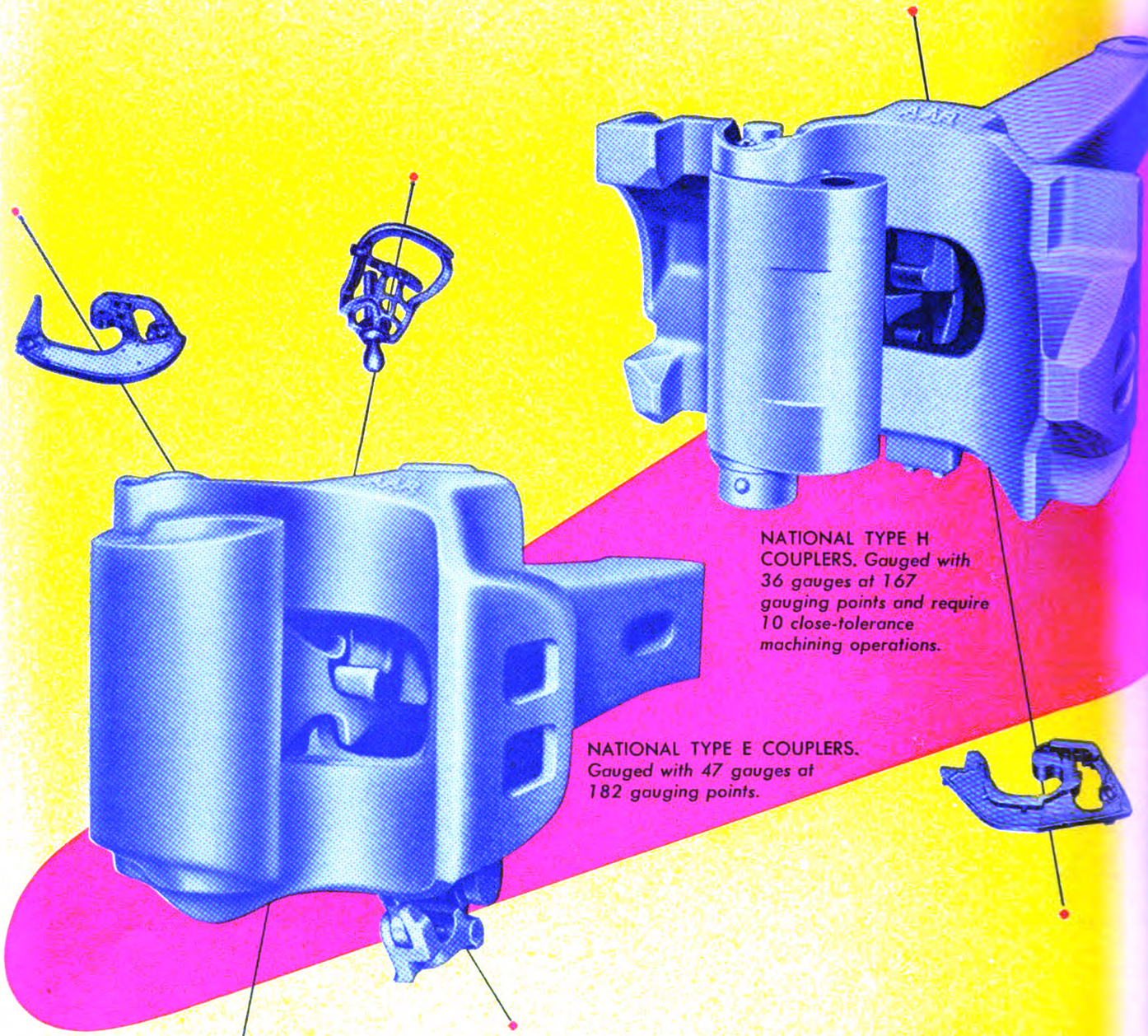
FAIRBANKS-MORSE

a name worth remembering when you want the BEST

DIESEL LOCOMOTIVES AND ENGINES • MOTOR CARS AND RAILROAD EQUIPMENT • ELECTRIC MOTORS • GENERATORS • PUMPS • SCALES • WATER SERVICE EQUIPMENT • HAND LAMPS

Key to Successful Railroading

NATIONAL



NATIONAL TYPE H COUPLERS. *Gauged with 36 gauges at 167 gauging points and require 10 close-tolerance machining operations.*

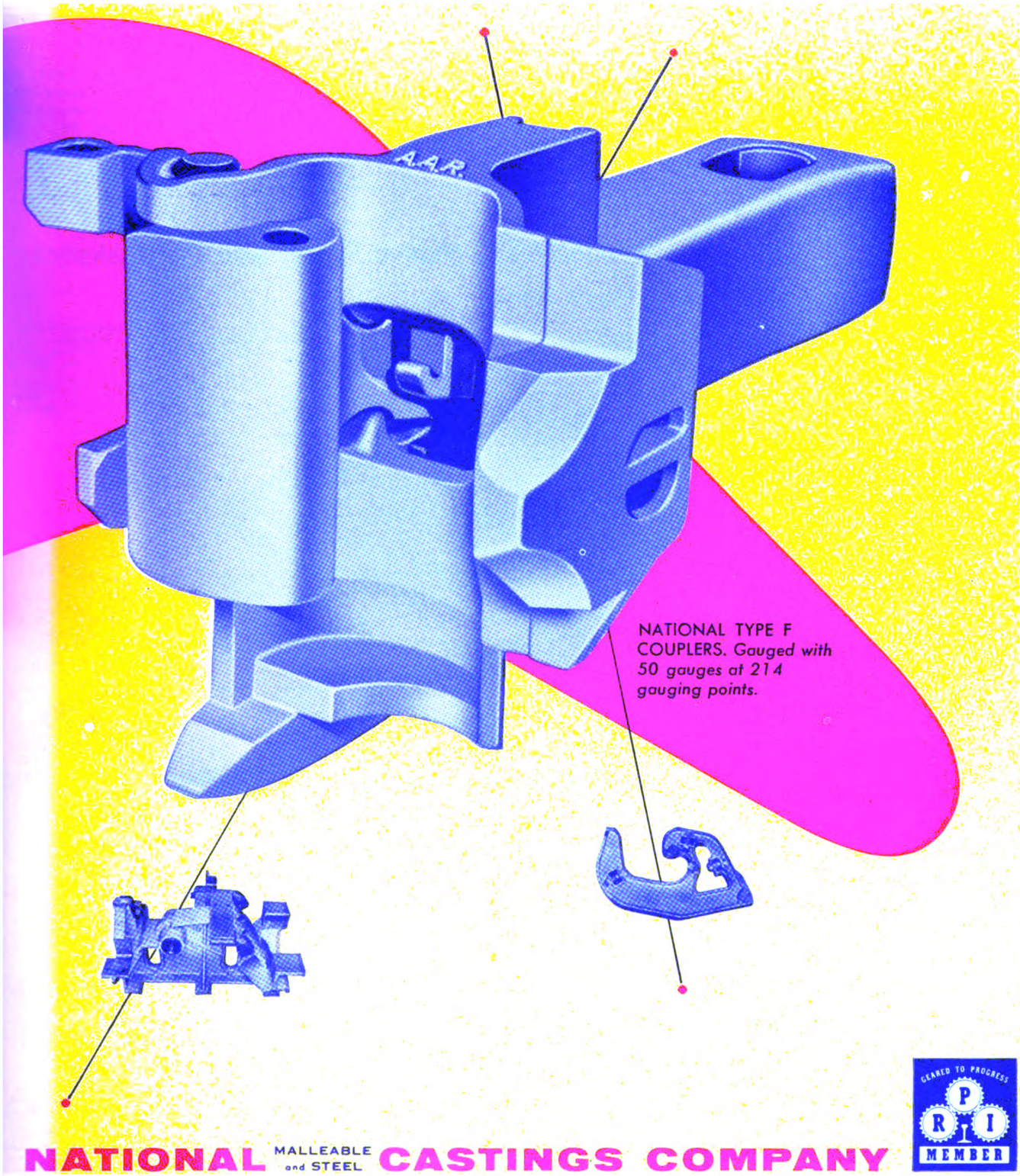
NATIONAL TYPE E COUPLERS. *Gauged with 47 gauges at 182 gauging points.*

National was a leader in the introduction of the standard Type E Coupler in 1932 . . . again in 1945 with the introduction of the Type H Tightlock Coupler . . . and still again with the development of the remarkable Type F Coupler for freight service.

National leadership is based on many things—service . . . close quality control . . . and precise gauging to standards that exceed AAR minimum requirements. That means *National couplers look better . . . perform better . . . last longer.*

The Railroads are moving ahead—with National Specialties

COUPLERS



NATIONAL TYPE F COUPLERS. *Gauged with 50 gauges at 214 gauging points.*

NATIONAL MALLEABLE and STEEL **CASTINGS COMPANY**

GEARED TO PROGRESS P R I MEMBER

Established 1868

Railway Division Headquarters
Cleveland 6, Ohio

International Division Headquarters
Cleveland 6, Ohio

CANADIAN SUBSIDIARY

National Malleable and Steel Castings Company of Canada, Ltd.
Toronto 1, Ontario

COUPLERS
YOKES
DRAFT GEARS
FREIGHT TRUCKS
JOURNAL BOXES

(Continued from page 14)

cipitator on Diesel Locomotive Engine Air Intake, Peel Kangas and W. C. Kern, Baltimore & Ohio, and E. L. Richardson, Westinghouse Electric Corp.

Railway Traction Equipment Ventilating Systems, B. A. Widell, General Electric Co.

Improving Rail Adhesion on Diesel Locomotives, P. V. Garin, engineer research and mechanical standards, Southern Pacific.

April 10

9 am

The Hydracushion Car, W. K. MacCurdy and R. M. Hermes, Stanford Research Institute.

Wheel Slip Detection in Railroad Braking, C. M. Hines, Westinghouse Air Brake Co.

An Analog Computer Study of a Torsional Vibrations Problem, R. T. Gray and S. W. McElhenny, General Electric Co.

Available and Potential Developments in Design for Standard AAR Bearing Assemblies, M. A. Hanson, chief engineer, Magnus Metal Corp.

2 pm

Railroading in Canada, R. E. Swanson, Department of Railroads, Vancouver, B. C.

Aluminum in Rolling Stock: Impact Test at Collision Speeds, R. A. Campbell, J. G. Sutherland, J. F. Whiting, and R. A Kemp, Aluminum Laboratories, Ltd.

Vibration and Shock in Freight Cars as Cause of Lading Damage, J. C. Settles, Buckeye Steel Castings Co.

CNR Testing Heated Box Car

A prototype heated box car is undergoing rigorous test on the Canadian National. The unit is designed to carry all winter traffic now handled in refrigerator cars. It has a capacity of 3,220 cu ft as compared with 2,273 cu ft for a refrigerator car.

Miscellaneous Publications

SYMPOSIUM ON RAILROAD MATERIALS AND LUBRICATING OILS.—Volume comprises two symposia—the Symposium on Railroad Materials and the Symposium on Lubricating Oils which are published together since interrelated both in subject and in presentation at the Second Pacific Area National Meeting of the American Society for Testing Materials held in Los Angeles September 16-21, 1956. Contains 17 papers on diesel fuels, lubricating oils, cleaning compounds, and nondestructive testing methods. *American Society for Testing Materials, 1916 Race st., Philadelphia 3. Price, $4.50.*

ALUMINUM SHEET AND PLATE INFORMATION. 320 pages. Tables show characteristics of aluminum and its alloys, practical data on design, fabrication and methods of joining and fastening. The book is divided into sections, one of which describes the process of producing sheet and plate. Completely indexed. *Kaiser Aluminum & Chemical Sales, Inc., Dept. RLC, 919 North Michigan Ave., Chicago 11. Price $5.00. Free when requested on company letterhead.*

Subscribers—Please Note

When inquiring about subscriptions—renewals, new orders, or questions concerning Locomotives and Cars—please include your city postal-zone number *always*. In order to cooperate with the Post Office Department in the delivery of your magazine, we *must* include the zone number for each subscriber's address in zoned cities.

ASTM STANDARDS ON PETROLEU PRODUCTS AND LUBRICANTS (D-2) Contains 188 distinct standards pertaining petroleum products and lubricants, of wh 43 are new, recently revised, or have l their status changed. Among major to covered are measuring and sampling, cr petroleum, natural gases, butadiene, petrole lubricants, diesel fuels, lubricating oils, t bine oils, etc. Thirteen proposed methods test presented. *American Society for Tes Materials, 1916 Race st., Philadelphia 3. Pri $8.00.*

AAR LUBE AND FUEL OIL TEST MA UAL.—Mechanical Research Report MR- —Locomotive Diesel Engine Lubricating

(Continued on page 74)

Selected I.C.C. Motive Power and Car Statistics

• Freight Service

M211 Item No.		Month of December		12 months ended with December	
		1957	1956	1957	1956
3	Road locomotive miles (000):				
3—06	Total, Diesel-electric	34,216	37,282	437,994	445,960
3—07	Total, electric	581	694	8,157	8,690
3—04	Total, locomotive-miles	36,004	41,361	471,870	503,956
4	Car-miles (000,000):				
4—03	Loaded, total	1,381	1,632	19,068	20,224
4—06	Empty, total	993	986	11,598	11,335
6	Gross ton-miles-cars, contents and cabooses (000,000):				
6—03	Total in Diesel-electric locomotive trains	99,640	107,476	1,294,911	1,289,444
6—04	Total in electric locomotive trains	1,782	2,130	25,791	27,021
6—06	Total in all trains	105,594	119,536	1,405,093	1,457,311
10	Averages per train-mile (excluding light trains):				
10—01	Locomotive-miles (principal and helper)	1.02	1.02	1.02	1.03
10—02	Loaded freight car-miles	40.6	42.3	43.1	43.1
10—03	Empty freight car-miles	29.2	25.5	26.2	24.1
10—04	Total freight car-miles (excluding caboose)	69.8	67.8	69.3	67.2
10—05	Gross ton-miles (excluding locomotive and tender)	3,106	3,097	3,176	3,103
10—06	Net ton-miles	1,353	1,401	1,439	1,422
12	Net ton-miles per loaded car-mile	33.3	33.1	33.4	33.0
13	Car-mile ratios:				
13—03	Per cent loaded of total freight car-miles	58.2	62.3	62.2	64.1
14	Averages per train hour:				
14—01	Train miles	19.3	19.1	18.8	18.6
14—02	Gross ton-miles (excluding locomotive and tender)	59,486	58,366	59,186	57,071
M240 Item No.					
14	Miles per Diesel-electric unit day:				
14—01	Road freight units	191.3	—	207.1	—
14—02	Road passenger units	445.0	—	439.1	—
17	Car-miles per freight car day:				
17—01	Serviceable	41.3	45.8	45.6	46.8
17—02	All	39.4	44.2	43.7	45.0
18	Average net ton-miles per freight car-day	763	913	906	953
19	Per cent of home cars of total freight cars on the line	111.3	111.1	110.7	111.9

• Passenger Service

M213 Item No.					
3	Road motive-power miles (000):				
3—06	Diesel-electric	19,682	21,010	232,694	243,138
3—07	Electric	1,112	1,323	13,572	14,969
3—04	Total	21,083	22,874	249,824	266,505
4	Passenger-train car-miles (000):				
4—08	Total in all locomotive-propelled trains	224,899	247,098	2,567,683	2,766,315
4—11	Total in Diesel-electric locomotive trains	208,892	225,917	2,376,615	2,517,888
12	Total car-miles per train-mile	10.14	10.36	9.76	9.93

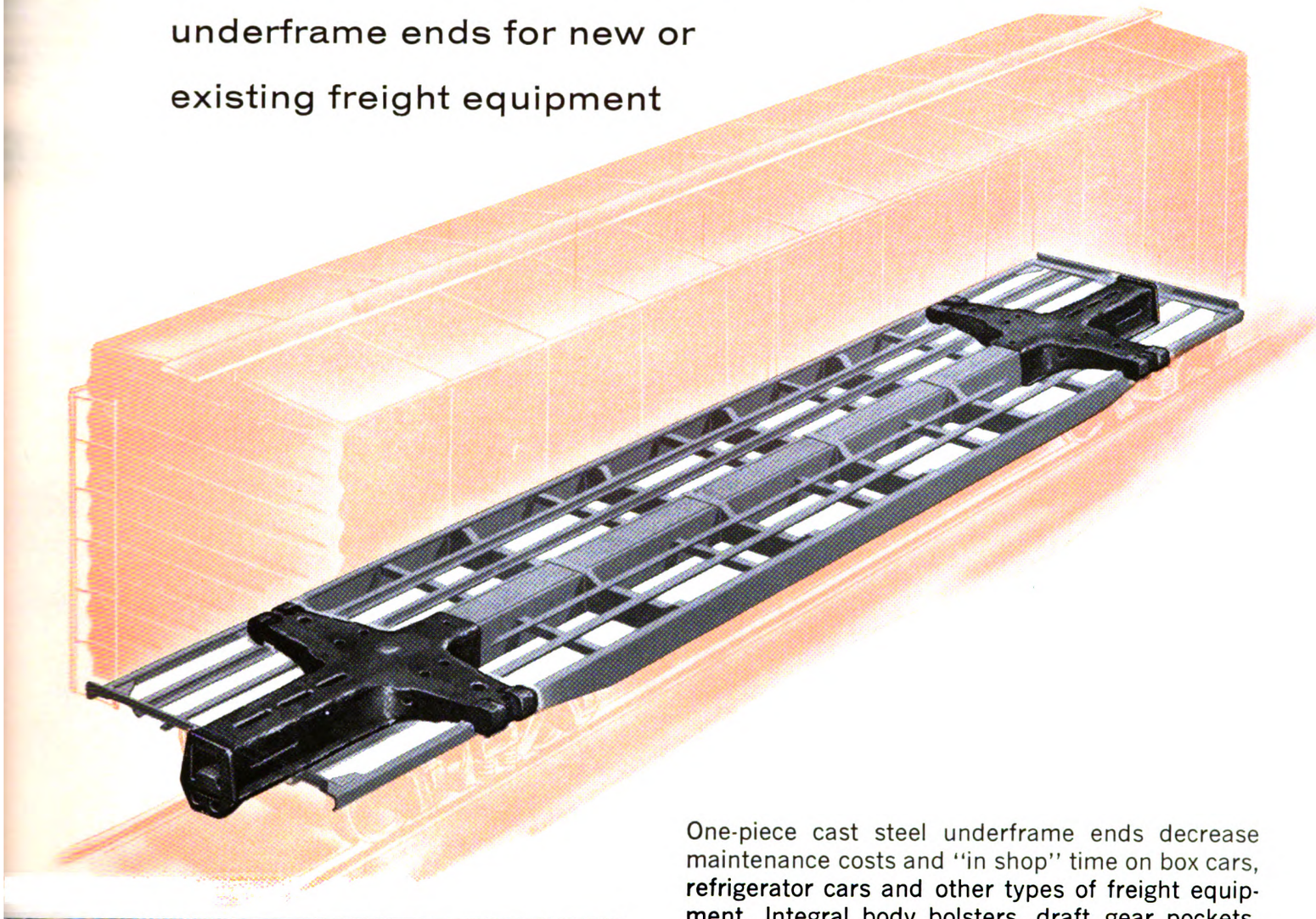
• Yard Service

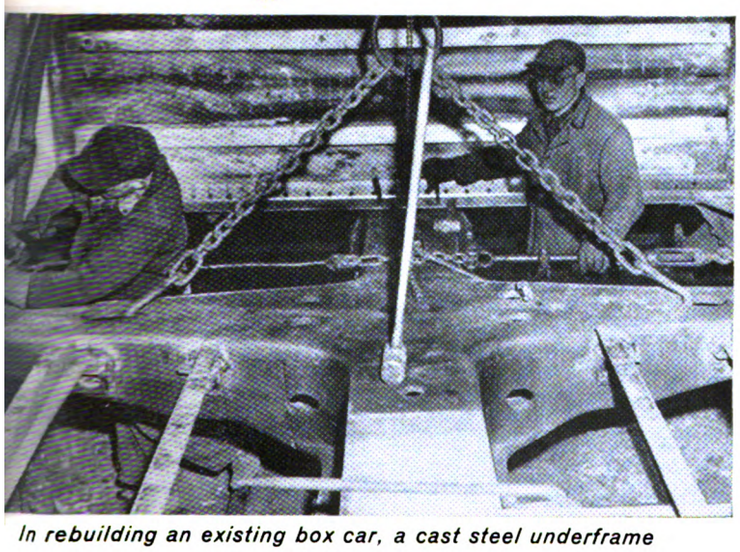
M215 Item No.					
1	Freight yard switching locomotive-hours:				
1—03	Diesel-electric[1]	3,524,949	3,871,394	44,964,107	45,754,194
1—06	Total	3,594,706	4,088,883	46,729,872	48,890,638
2	Passenger yard switching hours:				
2—03	Diesel-electric[1]	253,752	268,341	2,888,934	2,982,564
2—06	Total	282,411	302,492	3,222,644	3,385,832
3	Hours per yard locomotive-day:				
3—02	Diesel-electric	13.9	15.6	15.1	15.7
3—05	Serviceable	14.5	15.6	15.4	15.7
3—06	All locomotives (serviceable, unserviceable and stored)	13.1	14.5	14.2	14.4
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.80	1.72	1.70	1.68
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	0.77	0.75	0.77	0.75

[1] Excludes B and trailing A units.

Where railroad progress is cast in steel....

Today–more and more railroads order Commonwealth cast steel underframe ends for new or existing freight equipment





In rebuilding an existing box car, a cast steel underframe end is readily fitted into place.

One-piece cast steel underframe ends decrease maintenance costs and "in shop" time on box cars, refrigerator cars and other types of freight equipment. Integral body bolsters, draft gear pockets, strikers, coupler carriers and center plates provide many advantages for new or rebuilt cars.

- eliminate body bolster failures
- increase car life
- provide greater strength at draft lugs
- resist rust and corrosion
- meet AAR code for interchange

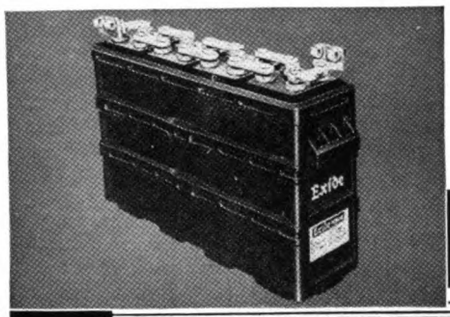
Here is a proved way to get longer freight car life with reduced upkeep costs—now in service on many progressive railroads.

GENERAL STEEL CASTINGS

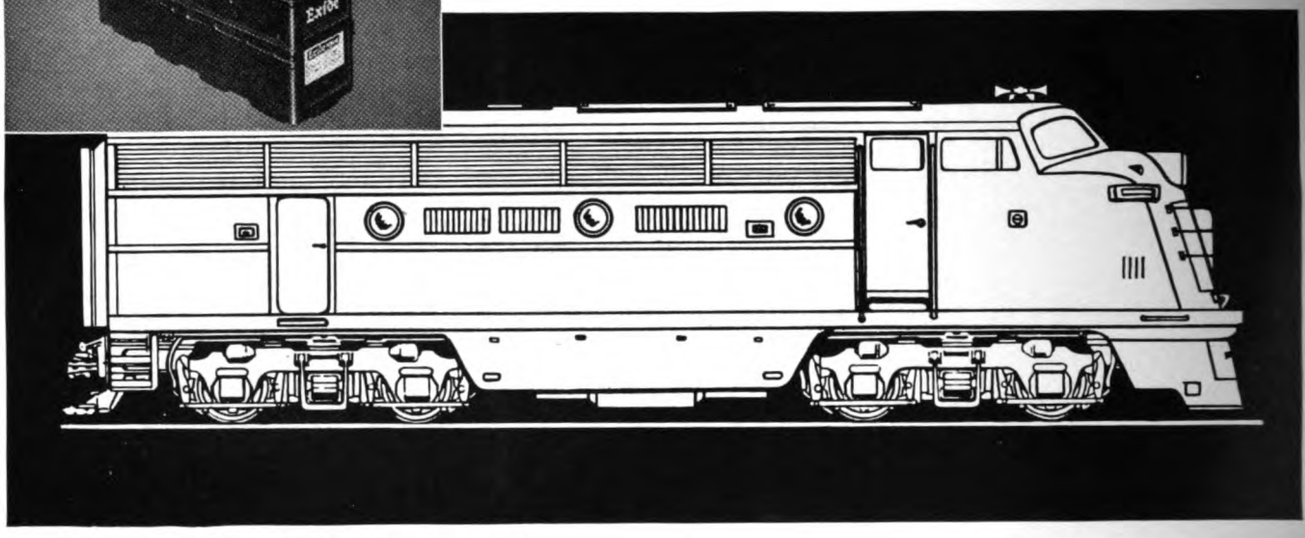
GEARED TO PROGRESS P R I MEMBER

GRANITE CITY, ILL. · EDDYSTONE, PA. · AVONMORE, PA.

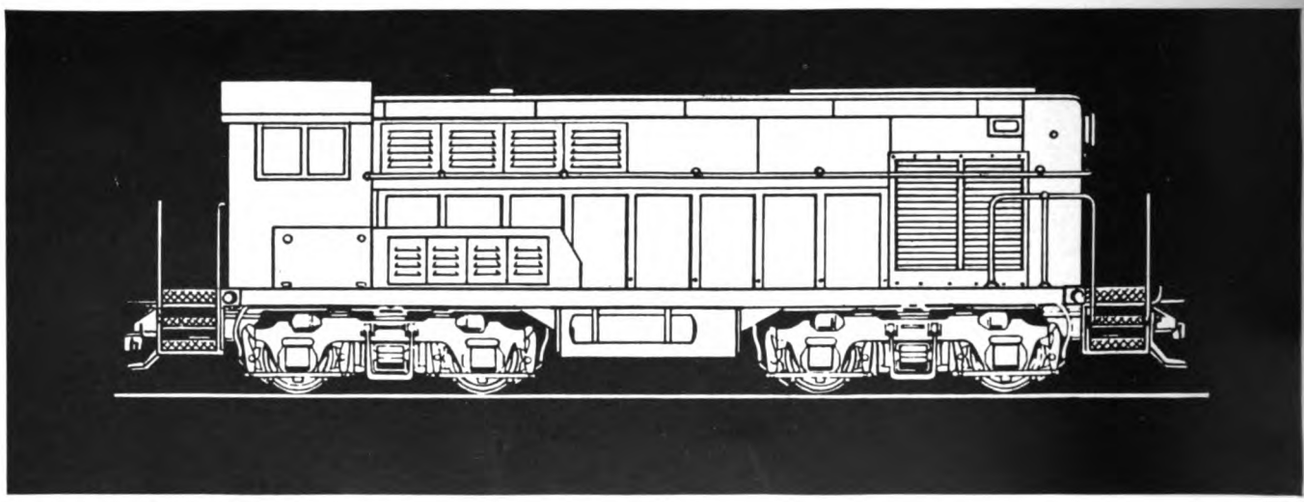
VERSATILE NEW BATTERY



New MGD Exide-Ironclad Diesel locomotive battery



Power for Road Types



Fits Switchers

Here's a battery you can use interchangeably in either of these two basic locomotive types. The new MGD Exide-Ironclad gives you far greater freedom and economy in using your available batteries. Its more efficient design packs more power into the same space. So your new MGD 420 amp-hr battery for road locomotives has the same physical dimensions as present 280 amp-hr batteries, such as are used in switchers.

Make sure you get this MGD Exide-Ironclad versatility next time you buy batteries. New design means actually superior performance and longer life. Saving in materials means extra economy. Beyond question, here is today's outstanding value in a diesel locomotive battery. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

HY 20 ROADS ARE TESTING NATIONAL CARTRIDGE BEARINGS

Combines the ruggedness of the solid bearing with the advantages of a sealed unit — at a much lower cost!

That's the reaction we've been getting from the twenty railroads now testing the National Cartridge Bearing . . . a truly rugged, completely sealed and self-lubricated bearing—*at much lower cost than roller bearings.*

With its large 270° bearing surface, tough bronze parts, simple construction, and flat back design, the National Cartridge Bearing is far better able to stand up to impact than roller bearings.

The unit is so effectively sealed that it can go for months between oil checks. In the meantime no other inspection is needed. Cars equipped with the National Cartridge Bearing can be dumped without losing a drop of oil.

Installation is a cinch too. Only five simple parts and seven screws to the entire assembly. Slips on and off in a hurry, without need of special tools or facilities. Fits inside of the standard journal box after the dust guard well has been removed . . . or under pedestal side frames, either narrow or wide jaw, with the use of simple adapters.

It's easy to see why twenty roads are testing the National Cartridge Bearing—it looks like the journal bearing of the future!

A-712

AMERICAN Brake Shoe COMPANY

RAILROAD PRODUCTS DIVISION
530 Fifth Avenue, New York 36, N. Y.

SINCO
CAR OIL
#355

A Revolutionary New Premium-Type Car Oil to Help You Cut Costly Delays Due to Hot Boxes

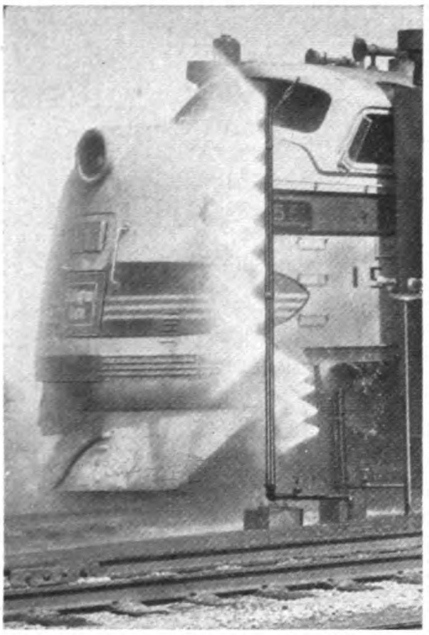
Field and Laboratory Tests Prove that Sinco Car Oil #355, Compounded from Natural High Quality 100 Plus V.I. Oils (No V.I. Improver), Gives You Important Advantages.

1. All-weather protection – will not congeal in cold weather nor thin out under heat.
2. Better oil cushion between bearing and journal.
3. More rapid flow through waste or pad to guarantee instant lubrication.
4. Anti-rust and oxidation inhibited.

For additional information, contact Sinclair Refining Company,
Railway Sales, 600 Fifth Avenue, New York 20, New York.
Chicago • St. Louis • Houston.

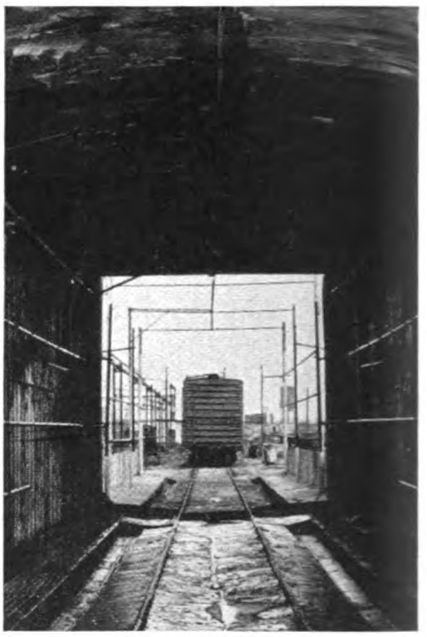
SINCLAIR Railroad Lubricants

HERE ARE WYANDOTTE CLEANIN

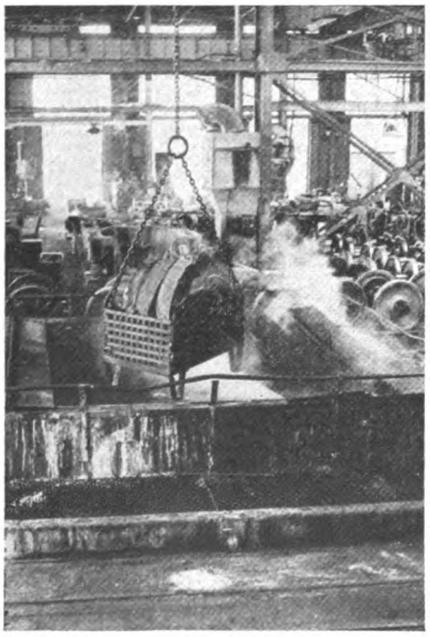


About 15¢ per unit for exterior diesel cleaning (machine washing). With an automatic washer and using WYANDOTTE-75, your diesels will be sparkling clean in just 1½ minutes per unit.

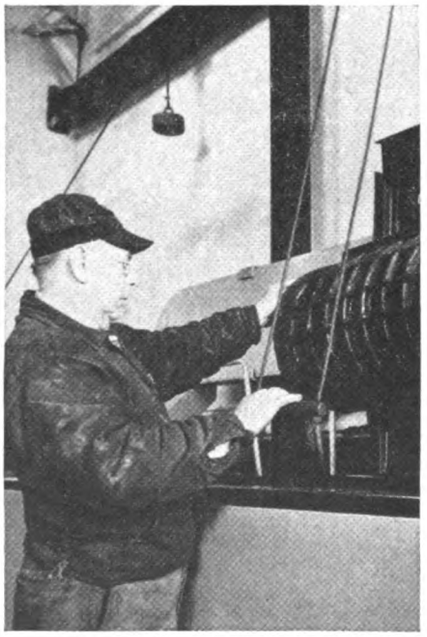
Only $1.35 per passenger diesel unit interior, using WYANDOTTE-30. No back-breaking labor. No costly hand wiping with Wyandotte spray-on, spray-off method. Units are sparkling clean, oil-free.



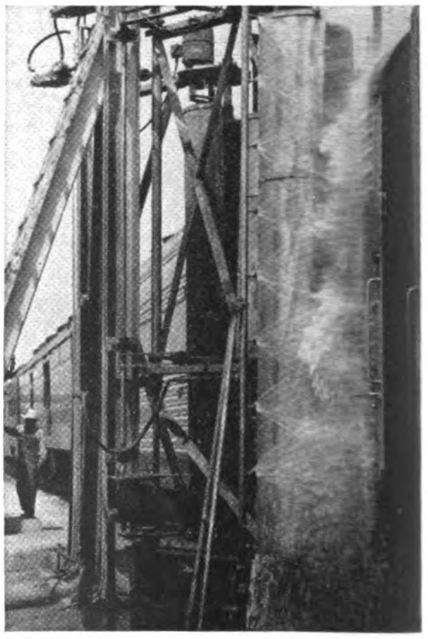
For less than $7, and in less than 8 minutes, WYANDOTTE-21 strips all paint from a boxcar. This cost includes stripper, labor, phosphatizing, and *all* other costs. Stripping tunnel is used; no hand labor.



Just 2½¢ to vat-clean a ton of ferrous parts with WYANDOTTE-11. This cleaner has good emulsifying characteristics, long service life, 100% solubility in water, controlled uniform quality, and low use-cost.



Only 3¢ to vat-clean a ton of aluminum parts with WYANDOTTE ALTREX.® You'll get a better cleaning job, and a faster one, with ALTREX. Compare this cost with that of any other cleaner on the market.



Just 13½¢ and one minute clean exterior of a passenger car (machine washing). Using WYANDOTTE-85, your cars stay bright and clean without paint damage. WYANDOTTE-85 is well inhibited, too!

ISTS--WHAT ARE YOURS?

Take a look at your cleaning operations—see if Wyandotte might help you clean better, faster!

The true measures of an efficient cleaning operation are actual results and unit-cleaning costs—not the price-per-pound of the cleaning product.

Because cleaning is our business, and because of long experience in the railroad field, we have developed cleaning products designed to give you better results—save you *time and labor,* and do a better job.

Equally important, Wyandotte cleaning methods assure you of the maximum from your maintenance personnel and equipment, and positively establish a more efficient operation for you at use-costs equal to or less than those shown.

Dealing with Wyandotte brings you benefits—in both effective products and helpful services—that could only come from the resources, research, and know-how of the largest supplier of specialized cleaning and washing products for business and industry.

Use Wyandotte's cleaning service. It gets results—saves time, saves dollars!

Your Wyandotte cleaning specialist is assigned permanently to your line. He devotes his time to improving your cleaning in any local area or on a systemwide basis. Thus, he coordinates his activities with the requirements of your mechanical, purchasing, and test departments.

Get more details by writing us today! *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, Calif. Offices in principal cities.*

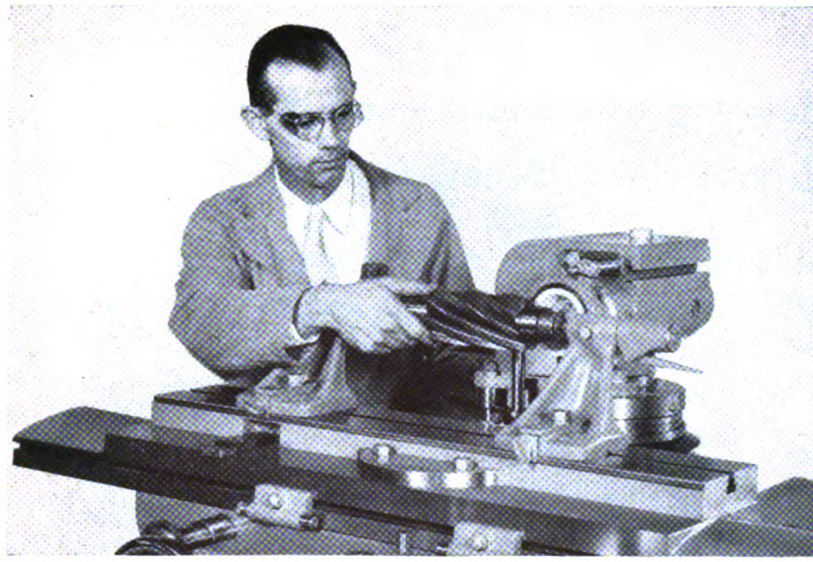
Wyandotte CHEMICALS

REG. U. S. PAT. OFF.

J. B. FORD DIVISION

)MPLETE LINE OF CLEANERS FOR ALL RAILWAY NEEDS

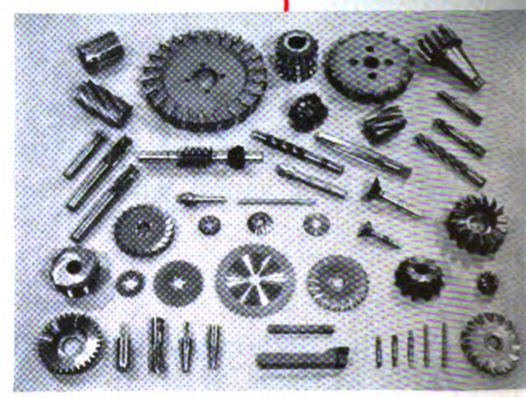
Cincinnati No. 2



Rear left-hand working position is the most convenient for grinding plain helical tooth cutters on CINCINNATI No. 2 Cutter and Tool Grinders.

. . . accurately grinds just about every cutter in the shop

CINCINNATI



Wide range and variety of cutting tools which may be accurately ground on a CINCINNATI No. 2 Cutter and Tool Grinder.

CINCINNATI No. 2 Cutter and Tool Grinder

CINCINNATI No. 2's give you the opportunity to attain two desirable objectives in your cutter maintenance program: 1) Cutters of any size and type, ranging from small end mills no bigger than a pencil to heavy 18" diameter face mills, can easily be ground on these machines. 2) Cutters are quickly and accurately restored to top cutting trim. ¶ Check these advantages of CINCINNATI No. 2 Cutter and Tool Grinders against any other equipment within their range:

Anti-friction ball bearing table slide, with hardened and ground ways

Four operating positions, with both mechanical and electrical controls at the operator's fingertips

Vertically adjustable wheelhead pile, with eccentrically mounted wheelhead to gain extra range

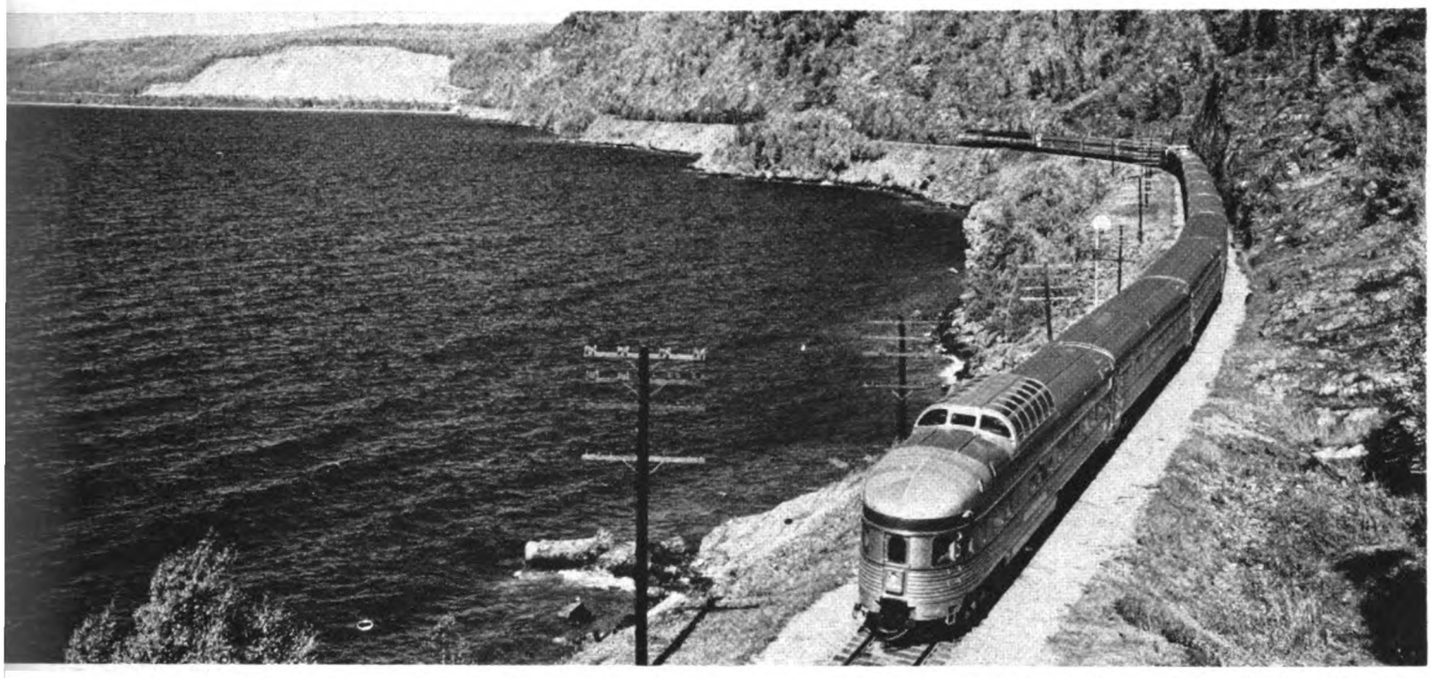
There are many other reasons why you should choose Cincinnati for all your cutter grinding requirements. A few are outlined in Sweet's Machine Tool File. More information in catalog No. M-2004. May we send a copy to you?

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

Catalog No. M-2004

CINCINNATI®

MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • SPECIAL MACHINE TOOLS • METAL FORMING MACHINES HARDENING MACHINES • CUTTING FLUIDS • GRINDING WHEELS



Curves and grades cut CPR wheel life. Here the "Canadian" skirts north shore of Lake Superior on rugged Schreiber district.

CPR Proves AAR and Budd Were Right

Complete records, along with the staff and facilities for making special studies, frequently pay off for the Canadian Pacific. This has been the case in a wheel wear investigation completed recently. The records system was set up in 1954 as part of a preventive maintenance program for a fleet of 173 stainless-steel passenger cars.* Let's look at the way this complete data has been used in investigating the wheel problem.

When the 173 cars were ordered from the Budd Company the class of wheel applied had to be settled. Class BR" wheels were the existing standard for passenger service on the Canadian Pacific, but the Budd Company recommended class "CR" wheels.

Both the BR and CR types are manufactured under AAR specification M-107. Both types are heat-treated, multiple-wear, wrought-steel wheels. The only difference in chemical composition is that the "C" wheel has a higher carbon content and consequently its heat-treated surfaces are usually harder. The AAR specification tells exactly what each of these wheels is intended to do. Class B, says the specification, is for "high-speed service with severe braking conditions and higher wheel loads." The class C wheel is for "(*1*) service with light braking conditions and high wheel loads, or (*2*) service with heavier braking conditions where off-tread brakes are employed."

The whole subject of BR and CR wheels used on passenger cars has been a very controversial one with American railroads. Class BR wheels had given good service in passenger service on the Canadian Pacific under extreme weather

Here's What the AAR Says . . .

AAR Specification M-107-56: Wheels, Multiple-Wear Wrought Carbon Steel, Untreated and Treated

1. SCOPE (a) These specifications cover multiple-wear wrought carbon steel wheels for locomotives, tenders, and cars—one Class U, untreated, and three classes (A, B and C) of heat-treated wheels.

(b) The service for which the various classes are intended generally is as follows:

Class U—General service for which an untreated wheel is satisfactory.

Class A—High speed service with severe braking conditions, but with moderate wheel loads.

Class B—High speed service with severe braking conditions and higher wheel loads.

Class C—(1) Service with light braking conditions and high wheel loads, or (2) Service with heavier braking conditions where off-tread brakes are employed.

8. CHEMICAL COMPOSITION:

	WHEEL CLASS B	C
Carbon	0.57 - 0.67	0.67 - 0.77
Manganese	0.60 - 0.85	0.60 — 0.85
Phosphorus (not over)	0.05	0.05
Sulfur (not over)	0.05	0.05
Silicon (not less than)	0.15	0.15

11. BRINELL HARDNESS

Minimum Rim Hardness	277	321
Maximum Rim Hardness	341	363

18. MARKING (b) The marking to designate the class and method of heat treatment . . .
BR—Class B, rim treated.
CR—Class C, rim treated.

*This preventive maintenance system and its records were described in Railway Locomotives and Cars, August 1957, p 35, and September 1957, p 46.

Day by Day Reports . .

CANADIAN PACIFIC RAILWAY COMPANY

OFFICE OF CHIEF OF M.P. & R.S.

M.P. 617

JANUARY, 1955

MONTHLY WHEEL REMOVAL RECORD ON STAINLESS STEEL PASSENGER CARS

MONTH OF May, 19 55 STATION Toronto Union FOREMAN General Car Foreman

CAR NAME OR NUMBER	DATE OF WHEEL CHANGE	PEDESTAL LOCATION	REMOVED WHEEL NUMBERS	REASON FOR REMOVAL	REMOVED ROLOKRON NO.	ROLOKRON SETTING WHEN REMOVED	INSTALLED WHEEL NUMBERS	ROLOKRON NO. INSTALLED
3005	May 17th	RL-3 x	322 - 350	Rule PC7, 71E	B-3615	.030	20 - 40	B-3979
"	May 17th	RL-2 x	36587 - 36569	" " "	B-3642	.030	287 - 32	B-4174
Burton Manor	May 18th	RL-3 x	14 - 28	" " "	B-3926	.050	343 - 318	B-3615
Grant Manor	May 18th	RL-2 x	333 - 353	" " "	B-2817	.030	36587 - 36569	B-3642
Rogers Manor	May 19th	RL-4 x	170 - 12	" " "	B-4211	.030	258 - 187	B-3761
Lorne Manor	May 19th	RL-3	228 - 237	Symbol 74T	B-3794	.045	198 - 214	B-3767
3013	May 20th	RL-3 x	216 - 224	Rule PC7, 71E	B-3894	.030	20 - 2	B-4211
Chateau Rouville	May 20th	RL-3 x	243 - 38	" " "	B-3774	.030	322 - 350	B-3794
Drummond Manor	May 21st	RL-1 x	236 - 290	" " "	B-3256	.050	228 - 237	B-3894
Kent	May 22nd	RL-2 x	3041 - 3065	" " "	B-4007	.030	3066 - 3067	B-3774
Osler Manor	May 22nd	RL-4 x	229 - "	"				
100	May 22nd	RL-4 y	3035 - 3814	"				
"	May 22nd	RL-2 x	3881 - 3896	"				
"	May 22nd	RL-1 x	3098 - 3074	"				
Chateau Maisonneuve	May 24th	RL-2 x	139 - 146	"				
Empress	May 24th	RL-1	3898 - 3084	"				
Burton Manor	May 25th	RL-2	153 - 6	Defec				
110	May 26th	RL-4	3100 - 3855	Rule				
Bliss Manor	May 29th	RL-1	260 - 281	Symbo				
102	May 29th	RL-3 x	3106 - 3060	Rule				
Chateau Brule	May 29th	RL-1 x	4 - 226	"				
Drummond Manor	May 30th	RL-3	250 - 718	Symbo				
Cornwall Manor	May 30th	RL-3	145 - 101	Defec				

Day-by-day reports of wheels removed at termi and of wheels scrapped at the Montreal wheel s where all this work is done, give CPR data to b up into complete wheel records.

CANADIAN PACIFIC RAILWAY COMPANY

MONTHLY WHEEL SCRAPPING RECORD

DISC BRAKE EQUIPPED WHEELS

MP-615

IDENTIFICATION NUMBERS OF WHEELS REMOVED FROM AXLE						SERIAL NUMBER OF WHEELS APPLIED	WAS OLD AXLE SCRAPPED
MONTH	YEAR	BRAND	SERIAL NUMBER	CLASS	HEAT TRMNT.		
December 10th	1956	B	3098 - 60 - P - 509	C	R	P 86455 - 19199	R.R. T I N Ret to
"	"	"	3071 - P - "	"	"	" 86 - 19	" " " "
"	"	"	72316 - A - "	"	"	" 86480 - 19199	" " " "
"	"	S	350 - ? - 1416	C	R	" 86380 - 19201	" " " "
"	"	"	322 - ? - 1430	"	"	" 86303 - 19200	" " " "
"	"	T	72328 - A - 1877	B	R	" 86401 - 19198	" T I N " "
"	"	"	72315 - A - "	"	"	" 86295 - 19200	" " " "

MONTH OF....December 1956.....19..... WHEEL SHOP Car Machine Shop.. FOREMAN.....

Month by Month Summaries . .

Month-end summaries of all wheel changes for Budd car fleet enable the railroad to know exactly what performance is, and in this case, to compare service given by two types of wheels.

WHEEL CHANGE-OUT RECORD FOR MONTH ENDING August 31, 19 57

STAINLESS STEEL PASSENGER CARS

SERIES	No. of Wheel Change-outs during month	NO. OF WHEEL CHANGE-OUTS FOR EACH SERIES OF CARS AND REASON FOR WHEEL REMOVAL ALSO PERCENTAGE OF DEFECTS FOR EACH SERIES TO TOTAL OF ____ CHANGE-OUTS SHOWN FOR MONTH: Shell Tread		Worn Flange		Skid Flat		Worn Tread		Built-up-Tread		Other Defects		AVERAGE MILEAGE OBTAINED PER WHEEL CHANGE-OUT FOR MONTH SHOWN	REMARKS
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Baggage - Dormitory 3000 - 3017	6	2	1	4	3									102,699	
Dome Coaches Skyline - 500 - 517	21	4	3	14	10	1	.8					2	1	78,119	
DeLuxe Coaches 100 - 129	11	4	3	6	4							1	.8	124,578	
Diners	17	4	3	12	9			1	.8					73,836	
Roomette Sleepers Manor Series	31	10	7	19	14			1	.8			1	.8	81,028	
Duplex Roomette Sleepers Chateau Series	29	7	5	18	13			4	3					89,347	
Dome Observation-Lounge Park Series	24	6	4	12	9							6	4	53,065	
															Total Wheels removed during month
TOTALS FOR MONTH	139	37	26	85	62	1	.8	6	4.6			10	6.6	AVERAGE MILEAGE PER WHEEL-CHANGE OUT FOR MONTH 30,922	

TOTAL NO. OF WHEEL CHANGE-OUTS TO DATE

ALL CARS IN ALL SERIES	Total No. of Change-outs	Shell Tread		Worn Flange		Skid Flats		Worn Tread		Built-up-Tread		Other Defects		AVERAGE MILEAGE OBTAINED PER CHANGE-OUT	REMARKS
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
	5023	2401	48	1981	39.4	52	1	271	5.3	2	.1	315	6.2	68,666	

OFFICE OF CHIEF OF MOTIVE POWER AND ROLLING STOCK AUGUST 1957.

CLASS "ER" WHE

SERIES	No. of Wheel Change-outs during month
Baggage - Dormitory 3000 - 3017	4
Dome Coaches Skyline - 500 - 517	17
DeLuxe Coaches 100 - 129	5
Diners	13
Roomette Sleepers Manor Series	24
Duplex Roomette Sleepers Chateau Series	21
Dome Observation-Lounge Park Series	21
TOTALS FOR MONTH	105

ALL CARS IN ALL SERIES	Total No. of Change-outs														
	1222	477	39	594	49	10	1	61	5			80	6	51818	

OFFICE OF CHIEF OF MOTIVE POWER AND ROLLING STOCK AUGUST 1955.

CLASS "ER" WHE

SERIES	No. of Wheel Change-outs during month
Baggage - Dormitory 3000 - 3017	2
Dome Coaches Skyline - 500 - 517	4
DeLuxe Coaches 100 - 129	6
Diners	4
Roomette Sleepers Manor Series	7
Duplex Roomette Sleepers Chateau Series	8
Dome Observation-Lounge Park Series	3
TOTALS FOR MONTH	34

	13	3.8	16	4.7			3	9			2	6	AVERAGE MILEAGE PER WHEEL-CHANGE OUT FOR MONTH 110,992	

TOTAL NO. OF WHEEL CHANGE-OUTS TO DATE

ALL CARS IN ALL SERIES	Total No. of Change-outs	Shell Tread		Worn Flange		Skid Flats		Worn Tread		Built-up-Tread		Other Defects		AVERAGE MILEAGE OBTAINED PER CHANGE-OUT	REMARKS
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
	3801	1924	51	1387	36	43	1	210	6			235	6	76,973	

OFFICE OF CHIEF OF MOTIVE POWER AND ROLLING STOCK AUGUST 1955.

Wheel service between changes and total wheel l for the two types of wheels are indicated.

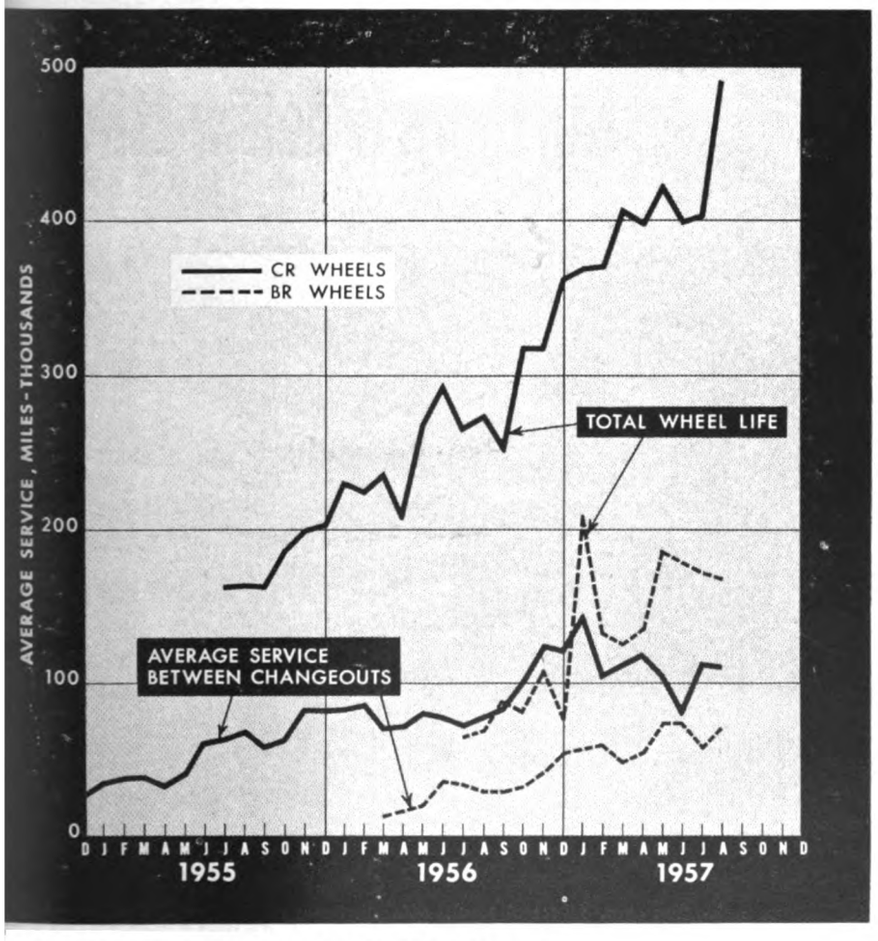
Produce These Records

CANADIAN PACIFIC RAILWAY COMPANY
MASTER WHEEL RECORD FOR BUDD EQUIPMENT

WHEEL SET NO'S.	APPLIED TO CAR: NAME OR NUMBER	APPLIED TO CAR: DATE	APPLIED TO CAR: CAR MILEAGE AT DATE SHOWN	REMOVED FROM SERVICE: DATE	REMOVED FROM SERVICE: AT CAR MILEAGE OF	REMOVED FROM SERVICE: DEFECT	WHEEL MILEAGE BETWEEN TURNINGS
321-327	3010	DEC-13-54	460	MAR 8/55	15660	SHELL	15660
	HEARNE MANOR	MAR-10-55	12568	MAY 6/55	29663	SHELL	17095
	CARLETON "	MAY-8-55	08430	SEPT 3/55	15911	W.F.	90682
	DUFFERIN "	SEPT-6-55	123456	JAN 31/56	200335	SHELL	76879
	ANNAPOLIS	FEB-3-56	252892	FEB 24/56	267592	SHELL	14700
						TOTAL	215016
					REPLACED	BY	
				71	881 - 72	071	
WHEEL SET FIRST INSTALLED DEC-13-54					SCRAPPED MAR. 21/56 ANGUS		
322-350	3005	NOV-17-54	460	MAY 11/55	29357	SHELL	29357
	CH. BOUVILLE	MAY-20-55	124081	SEPT-9-55	209574	W.F.	85493
	FRASER MANOR	SEPT-11-55	151552	FEB 19/56	250262	W.F.	98710
	PRINCESS	FEB 25/56	241070	DEC-4/56	455225	W.T.	214155
						TOTAL	427,715
					REPLACED	BY	
					86303-8	6380	
WHEEL SET FIRST INSTALLED NOV-17-54					SCRAPPED DEC-17-56-ANGUS		

Records for the individual wheel sets are on this page from master record. Wheel set is identified by wheel with lowest number. Mileages come from transportation department, other data from shops.

Show These Results



conditions. However, when off-tread braking was specified for the Budd passenger cars, it was decided to accept class CR wheels.

All of the 173 CPR cars were equipped with Budd's CF disc brakes. The cars were all built in Philadelphia and were equipped with CR wheels from U. S. mills. The Canadian Pacific decided to compare the life of BR and CR wheels under the Budd passenger cars and set up detailed records of wheel wear and wheel life. The BR wheels were introduced at wheel changes when the original CR wheels wore out.

The first car was delivered to the Canadian Pacific in July 1954 and the final car arrived nearly a year later. In December 1954 the CPR began to produce figures on wheel life. By July 1955 the first of the original CR wheels was being scrapped. All of the wheels applied to these cars since they arrived in Canada—both BR and CR—have been manufactured in England, but comply fully with AAR specifications.

Average life for the first five wheels scrapped in July 1955 was 162,959 miles. Already Budd had been called in because of the short service the wheels had been yielding between turnings. During their first months, this had been averaging less than 40,000 miles between trips to the drop pit.

One solution to this low mileage problem involved correction of erratic Rolokron action. Permissible tolerance in the Rolokron gap setting was reduced and these are now all set at 0.030 in. (plus or minus 0.005 in.). Soon service between turnings was averaging over 60,000 miles. Further work on the Rolo-

Car Class and Equipment	Wheel Sets Changed to Sept, 1957	Total Mileage	Average Mileage Per Change
"R" Series Sleepers 8-Sec, 2-Cpt, 1DR 6-Wheel Trucks Clasp Brakes BR Wheels Weight—184,000 lb	65	2,865,593	44,086
"U" Series Sleepers 14-Section 6-Wheel Trucks Clasp Brakes BR Wheels Weight—190,000 lb	474	31,503,791	66,463
"Grove" Series Sleepers 10-Rmt, 5-DBR 4-Wheel Trucks Clasp Brakes BR Wheels Weight—136,000 lb	71	4,482,821	63,138
Budd Cars Various Types 4-Wheel Trucks Disc Brakes CR and BR Wheels Weight—119,100 to 145,400 lb Total	5,023	344,910,547	68,666
BR	1,222		51,818
CR	3,801		76,973

kron led to the replacement of all the coils with a new type coil and produced a further increase in wheel service.

Soon after this—with CR wheels averaging about 80,000 miles between changes—the first BR replacements went into service. In no month since they have been used have these BR wheels ever equalled the performance of CR wheels. This is the case in mileage between turnings and is even more pronounced in total wheel life.

Total wheel life of both classes of wheels in general has been limited by flange wear and by shelling. To restore the contour to wheels with sharp flanges requires the removal of much more metal than is removed in eliminating a "shell-out." Because BR wheels are softer, they develop sharp flanges quicker in the same service.

This is demonstrated in cumulative CPR figures to last September:

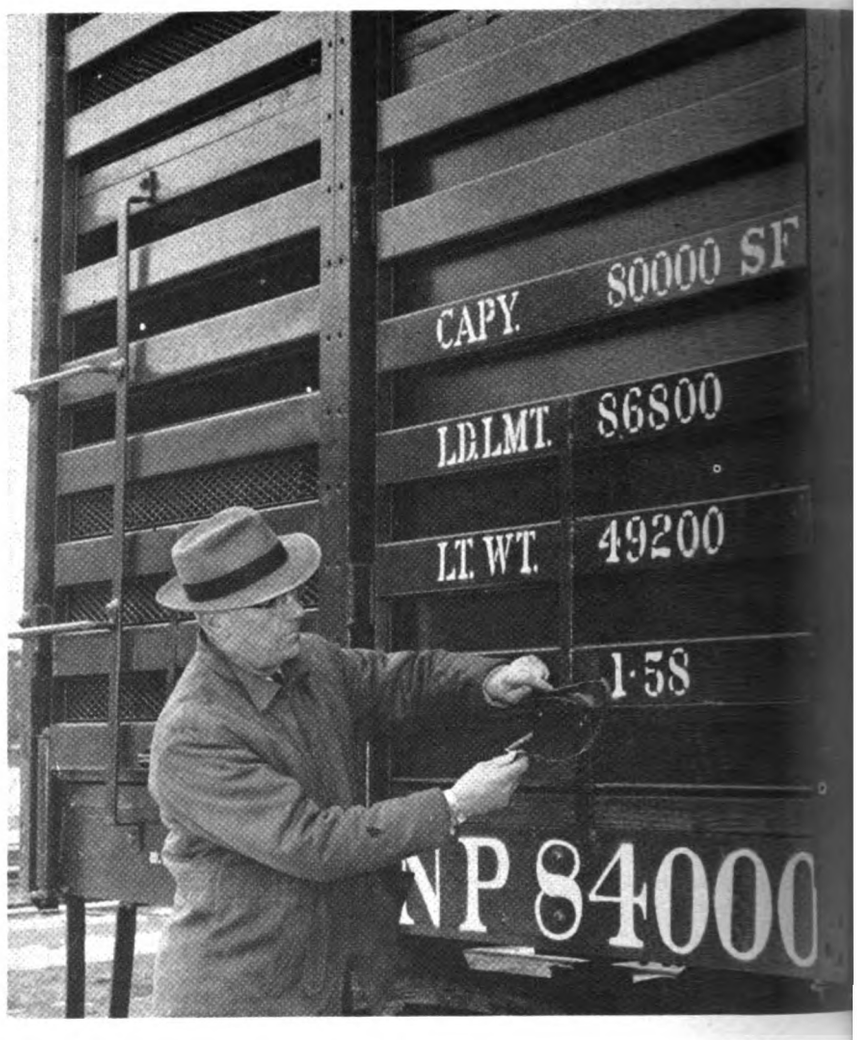
	Class BR	Class CR
Total wheel sets changed	1,222	3,801
Shelling	39%	51%
Sharp flange	49%	36%
Average mileage per changeout	51,818	76,793
Total wheel sets scrapped	179	948
Average total mileage	137,000	254,000

Even the complete wheel records which the Canadian Pacific has developed disclose no correlation between wheel wear and car weight, location under the car or in the train, or with axle drives. In one case, Brinell hardness readings were made on two sets of CR wheels which had shown wide variation in mileages between turnings. There was no measurable difference in hardness between the set of wheels which operated over 200,000 miles and the other set which ran off only 15,000 miles before it had to be dropped.

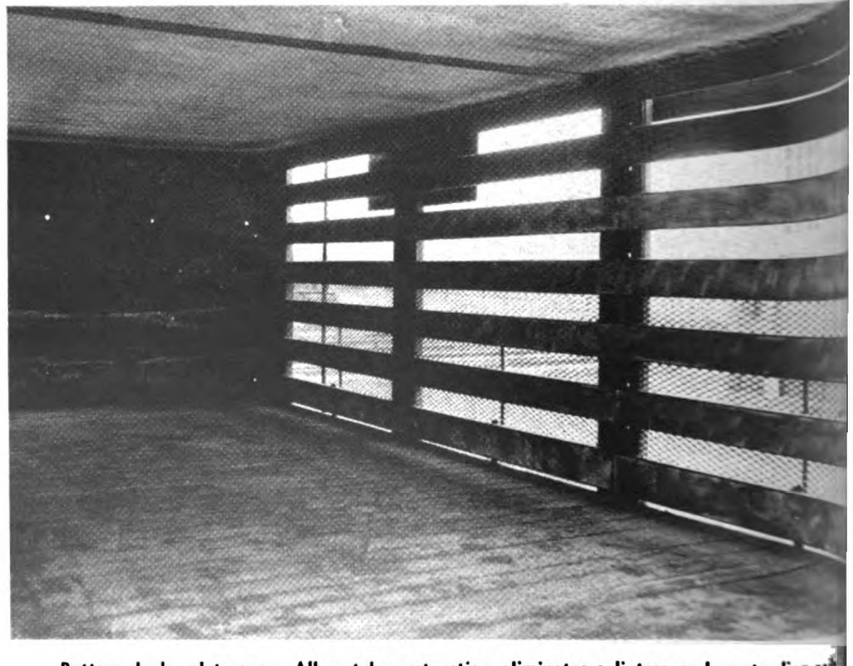
Some studies of the BR wheels under older standard and lightweight sleepers were made. These studies showed that the CR wheels used on disc brake equipped cars were superior to the BR's used under the older type cars even though the service in which the stainless steel cars operate is probably the most rugged on the CPR. On another occasion the Canadian Pacific did attempt to develop life of disc brake shoes. It was found that mileages obtained were as high as 200,000 miles on some shoes. Insufficient data prevented comparisons.

In the case of the two types of wheels, however, the answer seems well proved. Its figures have convinced the Canadian Pacific that the CR wheel is the type for its disc brake equipped stainless-steel cars.

Tests indicate conclusively that CR wheels on Budds with off-tread braking give longer life than BR wheels in similar service.

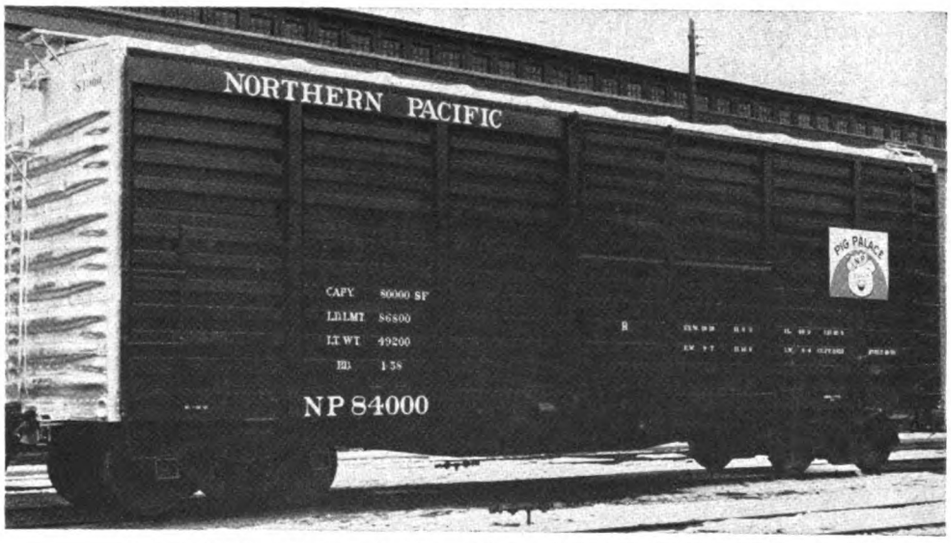


Northern Pacific Now H



Bottom deck—slats open. All metal construction eliminates splinters and protruding na

Shutter panel slides easily into position, and locks with retaining pin. Housing at bottom center contains counterbalance springs.



Northern Pacific's "happy porker" car with slats closed ready for winter operation.

GENERAL DIMENSIONS

Length inside, ft-in.	40—9
Length over end sills, ft-in.	40—9 1/2
Length over striking castings, ft-in.	42—1 1/2
Width inside, ft-in.	9—4
Width of side door openings, ft-in.	5—1 1/4
Height inside, top deck, ft-in.	5—1 5/16
Height inside, bottom deck, ft-in.	5—2 3/16
Height of side door openings, top deck, ft-in.	4—4
Height of side door openings, bottom deck, ft-in.	4—7 5/16
Height, top of rail to running board, ft-in.	15—2 1/4
Light weight, lb	49,000
Capacity, lb	80,000
Capacity, cu. ft.	3,922

ig Palace' Cars

ew double-deck, steel stock cars rolling off the assembly line at N.P.'s nard, Minn., car shop. Converted automobile cars originally built in), these 200 cars are said to be the to provide closing of openings be- n slats to protect animals in cold her. The interior body slats are e of steel instead of conventional d. Metal shutters arranged in panels he outside of the car are manually sted for complete or partial closure ie space between body slats. This inates the need for coopering or g cars with cardboard. The flexi- of the shutters will provide ade- e protection in case of unexpected ges in weather during transit.

ie steel underframe, ends, roof and ing boards on the automobile cars left in place. Doors, steel side ing and all wood was removed. The corner and end posts, made from steel side framing are spaced to divide the car side into six panels. Each panel is 5 ft, 5 in. wide, and extends vertically from the side sill to the roof. The body slats, 5½ in. wide, extend the length of car and are spaced 4 in. apart from bottom to top and welded to the posts.

Each panel is equipped with a sliding panel or shutters of formed metal slats, 4½ in. wide, and in number equal to the number of openings between the body slats. The sliding panels are counterbalanced with two springs, enclosed in a telescopic housing mounted on each side of the panel at the side sill. The shutters are normally open. In this position the springs are compressed and the slats are in alignment with body slats. The assembly is held in this open position with a retaining pin. To close the opening between body slats, the pin is removed and a handle at the bottom of the panel plus the force of the springs moves this panel upwards. The pin is then reinserted in a locking bar.

Coarse wire mesh screen covers the bottom three openings on each level. On the interior of the car, the mesh, body slats and ends are coated with latex Insulmat, $\frac{1}{16}$ in. to $\frac{3}{32}$ in. thick. This to prevent adhesion of animal flesh to the metal in cold weather. Top and bottom decking is tongue-and-groove fir, 2⅜ in. thick, the only wood construction in car. The Dalman trucks are equipped with Timken roller bearings, 33-in. one-wear wrought- or cast-steel wheels, and Holland E-2 volute snubber springs. W. H. Miner FR-16 and Cardwell-Westinghouse R-20 draft gears are used.

The exterior sides of car are painted brown and underframe and trucks black. To reflect the heat of sun during summer months, the ends, roof, and running board are painted aluminum.

The cars will be used principally in hog shipments from the Midwest to the Pacific Northwest.

Burlington's Shop Saves Time . . .

Power Assembly Overhaul Is One-Level Operation

Power assembly overhaul is performed at varying intervals on each Burlington diesel unit in the road's West Burlington, Iowa, shop. Engines are removed from the locomotive units for this work. The "Q" has found that working these engines on the shop floor releases overhead cranes for other work, reduces repair time, and makes engine work easier and safer.

Once out of the carbody, engines are moved to the adjoining heavy machine bay for disassembly. At post locations are ¾-ton electric hoists which facilitate parts removal. Parts reclamation work areas are connected with conveyors.

Eight men are assigned to an engine, each with a definite work position. Their responsibilities are to remove the foundation bolts, and then follow the engine to the floor where parts are removed and disassembled. Following this, replacement assemblies are applied and engine is returned to the unit. It takes about 2½ hrs to remove an engine, and two 8-hr days for the complete overhaul operations. While the work described here is performed mainly on EMD power, similar simplified procedures are followed on Alco and Baldwin units.

Each power assembly—head, piston, liner and connecting rod—is removed as a unit at the engine repair station. All parts of this assembly go first to the lye vat for cleaning after being placed in vat boxes which are handled by shop tractors and trailers. The lye vat is located outside to keep undersirable fumes and odors from the main shop. After cleaning, two men remove the head from the liner, and the head is stripped of its valves, springs and keepers. Rods are separated from the pistons and wrist pins and bushings are removed. Rings removed from the pistons are scrapped. Wrist pins are put in a separate container and sent to the small engine parts cleaning room. There they go through a cleaning solution, are inspected and checked for wear, and are then either returned to service or scrapped. No reclamation is done on wrist pins.

On Our Cover . . .

Diesel engine repair shop at West Burlington, Iowa, is the area where engines are placed after they are removed from locomotives. Parts removed here are then transferred to the adjacent heavy machine bay (shown above) where the processes described in this article take place.

Liners

Liners removed from the lye vat are placed eight on a special trailer for sand blasting. Water ports on the C liners are protected by steel plates, and liners with lower seals have the seals left in place for this operation. After being returned to the conveyor line, they are checked and marked for rebore, honing or scraping. Ridge reaming is not done. Instead, rebore operations are based on 0.030 in. and 0.060 in. oversizes, then the liner is scrapped. Liners worn about 0.004 in. are honed. In this case, the port relief zone is not touched. Liners are then wiped clean, lower seals removed (upper seals are left on for a water test), and they are moved on the conveyor to an American Pace Maker lathe adapted for boring. The boring bar is equipped with a spring-loaded

Liner reclamation is handled in the area at the center. Behind and to the right is the conveyor system for heads. Post cranes and tramrails facilitate materials handling at various steps in the processes.

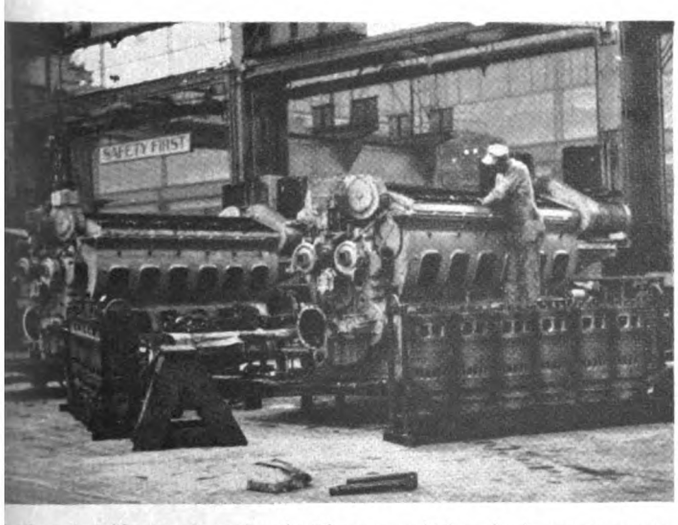
oughing and finishing tool, and does he job in one operation, including the ort relief. No honing is done after bor- ng. The next operation is an 80 psi ater pressure test. Following final leaning, studs are inspected and hecked for length. All seal surfaces are ire brushed. The edges of holes on the nside of the port relief zone are cham- ered, and the new size is restenciled on he liner. From here they go to assembly. The present output of rebored liners is 6 per day.

Heads

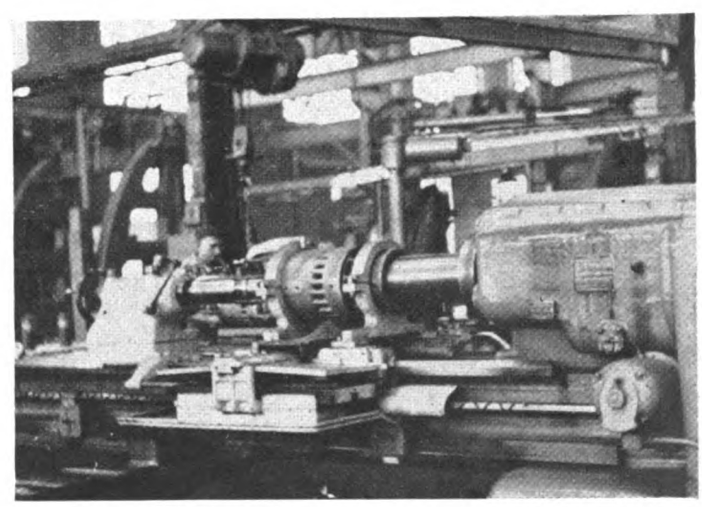
After cleaning, heads are returned to the cylinder head department where they are unloaded and placed face down on a trailer for sand blast. Each trailer holds ten heads and is tractor handled. Cleaned heads are inspected and those with cracks go to the welding booth.

In handling heads not requiring welding, a reamer is run through the valve guides, and the relief valve hole is redrilled and retapped. Heads meeting a pressure test of 80 psi go to a drill press for recutting of the valve seats to proper clearance. Next operation is on a boring mill where the upper head seal groove is polished and the head is faced if necessary. The railroad has developed its own standards in maintaining the proper distance between the face and head retainer seat, if the head is faced.

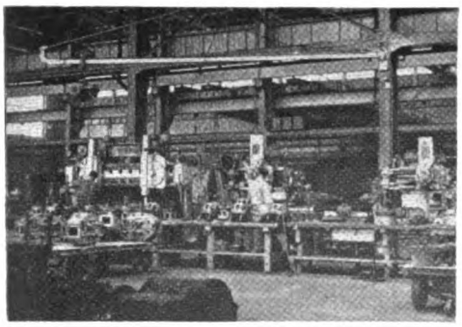
A lapping operation follows. The work is done on a 54-in. Putnam boring mill with an adapter table having fixtures to lap seven heads at once. The fixture is designed to impart a rotary motion to



ngine assembly area is equipped with cranes which make it unnecessary to se the overhead cranes during assembly or tear-down.

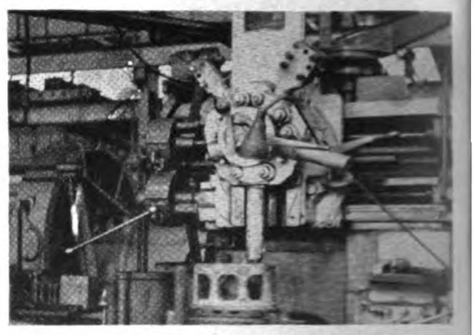


Spring loaded boring bar equipped with both roughing and finishing tools makes a one-pass operation of the liner re-finishing.



Head conveyor line connects the various reconditioning stations. Sequence of these operations is from right to left.

Special jig holds EMD head for the redrilling and tapping of the relief valve hole. Burlington has installed much special tooling.



Upper head seal groove is polished at this station. The head is faced here if that is necessary.

heads while the table revolves. During this time, the operator inspects studs and the injector well seats on other heads on a bench. After lapping, the heads are wire-brushed, and a final pressure test is given. The heads then move by conveyor to the valve-seat grinding operation. Two oscillating, Hall-Toledo, valve-seat, hand-type grinders produce thirty-five heads per day. With an additional man on the grinder, fifty heads can be turned out.

The final station is assembly of valves, springs and locking collars with a hydraulic spring compressor in one operation. The completed heads can either be used immediately or sent to the storeroom.

Cracked heads have the cracks melted out and welded with Heliarc equipment. All studs are removed before welding. The heads are preheated to 1,400 to 1,450 deg F in a lined circular metal box applied to a welding positioner. The box is supplied with covers having various openings to match the location of cracks. The positioner can be tilted at any angle to facilitate welding. After welding, the heads go through the drill press and boring mill operation on machines assigned to handle repaired heads. They are then placed on the regular production line conveyor for lapping and subsequent operations.

Pistons

Pistons from the lye vat are sorted by size, placed in lift truck skips in quantities of thirty-six, and brought to the repair line for visual inspection and pressure test. In the next operation, the pistons are mounted in a lathe and given a 5-min rotary wire brushing. This is followed by checking and cleaning grooves, and then removing shoulders on an adjoining lathe. Where groove width exceeds manufacturer's wear limits, the piston is scrapped. Cleaned and inspected pistons are magnafluxed and made ready for assembly with repaired liners.

The piston carriers are also cleaned and inspected. If the pilot on the carrier is worn, it is metallized and finished. A new bushing is applied, rough turned and broached with a shop-made tool made from a steam locomotive wrist pin. The broach is pushed through the bushing under hydraulic pressure. The bushing is then finish bored to size.

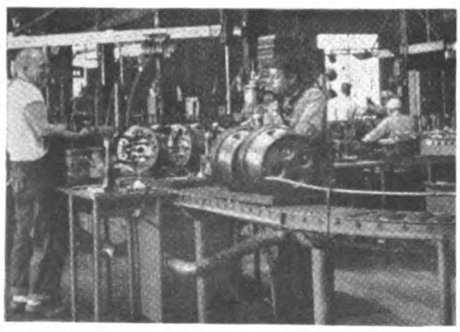
Connecting Rods

After rods are cleaned and Magnafluxed, they are trucked to the diesel engine department and placed in racks. The floating bushing is applied and each rod is checked for length, straightness and slipper surface. Each basket is kept with its rod. Metal spray is used to restore baskets to size. This is followed with a ground finish to assure correct length of the rod and fit on the bushing. The rods then move to assembly where all power parts are assembled and placed in wooden racks holding either four or six complete power units. These are handled by a crane to floor engine locations. Book records are kept in the assembly department showing the serial numbers of the engines, size of liners, pistons, heads, whether parts are new or reclaimed, date of repair, and other information.

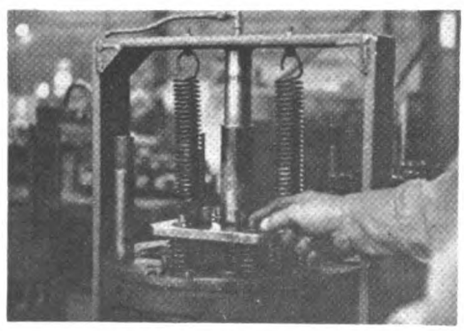
Engine Lubrication

When necessary to remove power assemblies at maintenance points, the injectors and connecting rods are also changed out, rocker arms are inspected and lash adjusters and wrist pins renewed if necessary. Replacement assemblies are furnished from West Burlington and parts removed are returned for reclamation or scrap.

A straight mineral base lube oil is used in Burlington passenger and freight engines. This oil is changed at 48,000 and 40,000 mile intervals respectively. Blotter tests and spectograph analyses are not done. The oil removed is reclaimed. Samples are then checked in the laboratory at Aurora, Ill., and reclaimed oil is generally re-used in all classes of power.



Conveyor brings the heads to the valve seat grinding station. The two grinders can turn out 35 heads per day.



Valves, springs, and locking collars are assembled at this station with a shop-made hydraulic machine.

Pistons are wire-brushed at the back. The other machine removes shoulders and cleans up ring grooves.

Virginian's newest hoppers are 41-ft over striking castings. The cars have 31-ft truck centers and have an inside width of 9-ft 9 in.

Goals of Virginian's Hopper Design

Pocahontas coal hauler's shop has had orders for 3,300 of these cars; Bethlehem built 500 cars of the same type for the Virginian last year.

In common with the other coal-handling railroads of West Virginia and Kentucky, the Virginian has been increasing its car fleet to meet the demands for export coal and to be ready for greater domestic consumption. A substantial portion of the coal which the Virginian loads for these markets will go into its newest hoppers—the road's class H-14. These 70-ton cars are not replacing older hoppers on a car-for-car basis. Actually many of them will be giving the Virginian greater coal-hauling capacity by swelling its hopper ownership.

The first of these cars was completed in 1955. By the spring of 1958 the Virginian shop at Princeton, W. Va., had completed almost 2,300 of the H-14's. Recently the Bethlehem Steel plant at Johnstown, Pa., built 500 of these cars for the Virginian.

The design for these hoppers is the Virginian's own. It was completed by the mechanical department in 1955. Two cars of the initial 300 built early in 1956 were tested at the Technical Center of the National Malleable & Steel Castings Co. in Cleveland during that summer. These tests proved the strength of the cars and no changes have been made in the design of subsequent cars as a result of these impact tests. In service the cars have not operated long enough for the road's mechanical officers to say positively that there will be no weak points. But, all the experience of a railroad which has operated thousands of open-top cars of all designs and capacities went into these H-14's.

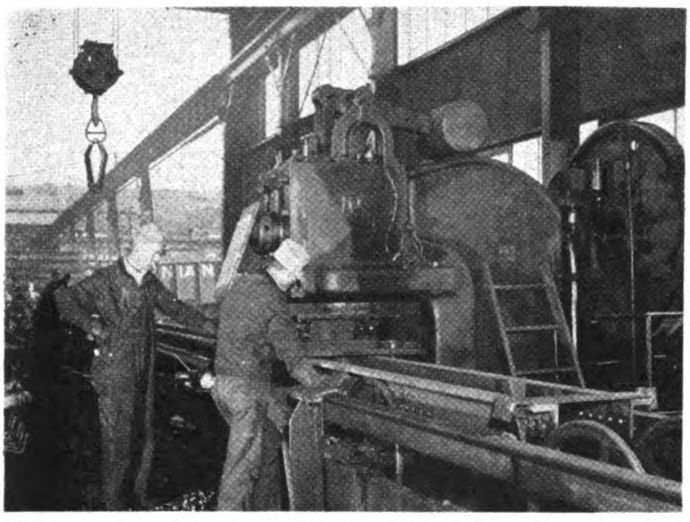
The Virginian aims at providing maximum corrosion resistance in the bodies of its cars. This has been accomplished by using low-alloy high-tensile steel body plates. Another means for reducing corrosive attacks is to have as few holes and lapped joints as possible in the floors of the cars. This means that most of the attachments between the body and underframe are through welded connections. It also means that sides, floors and hoppers are all welded to each other. With the aim of keeping structural members from contacting the lading, the Virginian has utilized outside side stakes. These stakes, instead of being the conventional pressings, are channels bent back through 180-deg. This means that the two flanges of the channel contact the car side and it is through both flanges that the stake is riveted to the sides. This type of stake does not have the reduced section at bends associated with more conventional stakes.

The fact that the side stakes are not pressed is indicative of another feature of these cars. The hopper doors are the only pressings used. The remainder of the car body and underframe is composed almost entirely of flat plates and straight structural sections. Only a very few plates have to be offset during fabrication for the building of these cars. Crossridge sheets, one-piece longitudinal hood and inside hopper sheets, and the one-piece upper floor and end sheets do require several fabricating steps.

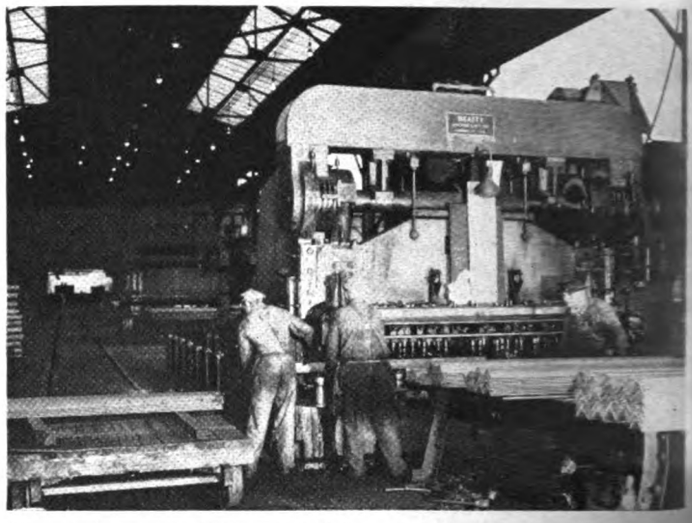
The Virginian uses the AAR 51.2-lb center sill section. The completed center sill has a minimum of holes in it for the

Partial List of Specialties for H-14 Hopper Cars

- Wine hopper door frames and locks
- Standard Railway Equipment uncoupling devices
- Miner A-22-XL draft gears
- National Malleable M-17-A draft gears
- Azee draft key retainers
- American Steel Foundries A-3 trucks
- Standard Car Truck S-2A trucks
- Positive brake regulators
- MS brake regulators
- Creco bottom connection safety supports
- Westinghouse AB-10 air brake
- Ajax hand brake
- Wright pipe clamps and tee anchors
- Cor-Ten steel plate material



Center sill Z-sections have webs punched and then two Z's are welded together by hand. This is followed by punching of top and bottom flanges.



Shop equipment at Princeton includes punches, shears and brakes for fabricating all car components such as the end sills being completed in car shop on this Beatty 36-hole punch.

same reason that the car floor was designed this way—to minimize corrosion by eliminating lapped joints. The bolsters are welded to their bottom cover plates which in turn are welded and riveted to the center sill. These cover plates also serve as the gussets to which the diagonal braces are attached. The Virginian uses two angles for each of its diagonal braces. Each of these pairs of angles, in effect, produces a Z section when the angles are riveted above and below the bolster cover plate and the corner gussets. Gussets connecting the bolster, center sill, and lower floor sheet are made from 15-in., 40-lb channels welded in position.

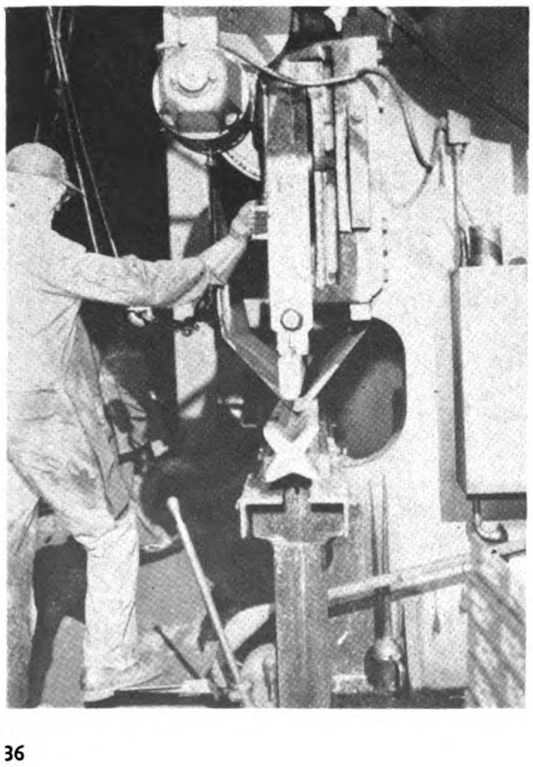
Bolsters are 21-in., 96-lb, wide-flange, I beams bent so that the joints between the lower and upper floors of the car rest on the upper flanges of these beams. These are the only riveted joints on the floor with the exception of the hopper area. Bottom side angles are 3½ x 5 x ½-in. angles running between the bolsters. Top side angles are 4½ x 5 x $\frac{7}{16}$-in. bulb angles running the length of the body. Clips attached to the bottom side angles support the outside hopper sheets which are flat triangular plates. The inside hopper sheets and longitudinal hoods are one-piece fabricated parts supported below the center sill by the combination center sill tie plate and inside hopper sheet support.

The upper floor and end sheet for these cars is made of $\frac{5}{16}$-in. LAHT steel, the lower floor is ⅜-in. LAHT, and the sides are the same material in ¼-in. thickness. The upper floor support is a 3½ x 2½ x ⅜-in. angle, the lower floor support is a ⅜ x 4½-in bar, and crossbearers have a ½-in. web with top and bottom cover plates. The side braces are the Virginian's own design—a cast steel I beam with feet which fit on the car side and on the cross ridge.

The side stakes and posts are riveted to the car side, as are the top bulb and the bottom side angles. The top angle is also welded to the side sheets with a skip-type weld which runs for approximately 15-in. back of each side stake. However, the stakes are not welded in any way to the side sheets or to the car frame members. By not making this framing too stiff, it is intended to resist the effects of car shakers.

Rather than rely solely on rivets in

(*Continued on page 38*)



Through these hoods, Virginian runs brake pipe in straight line from bolster to bolster above center sill. Train line is protected; requires no bending.

One-piece assembly forming the longitudinal hood and inside hopper sheets is formed on Cincinnati Shaper 10-ft press brake. Holes are for door frames; hopper supports.

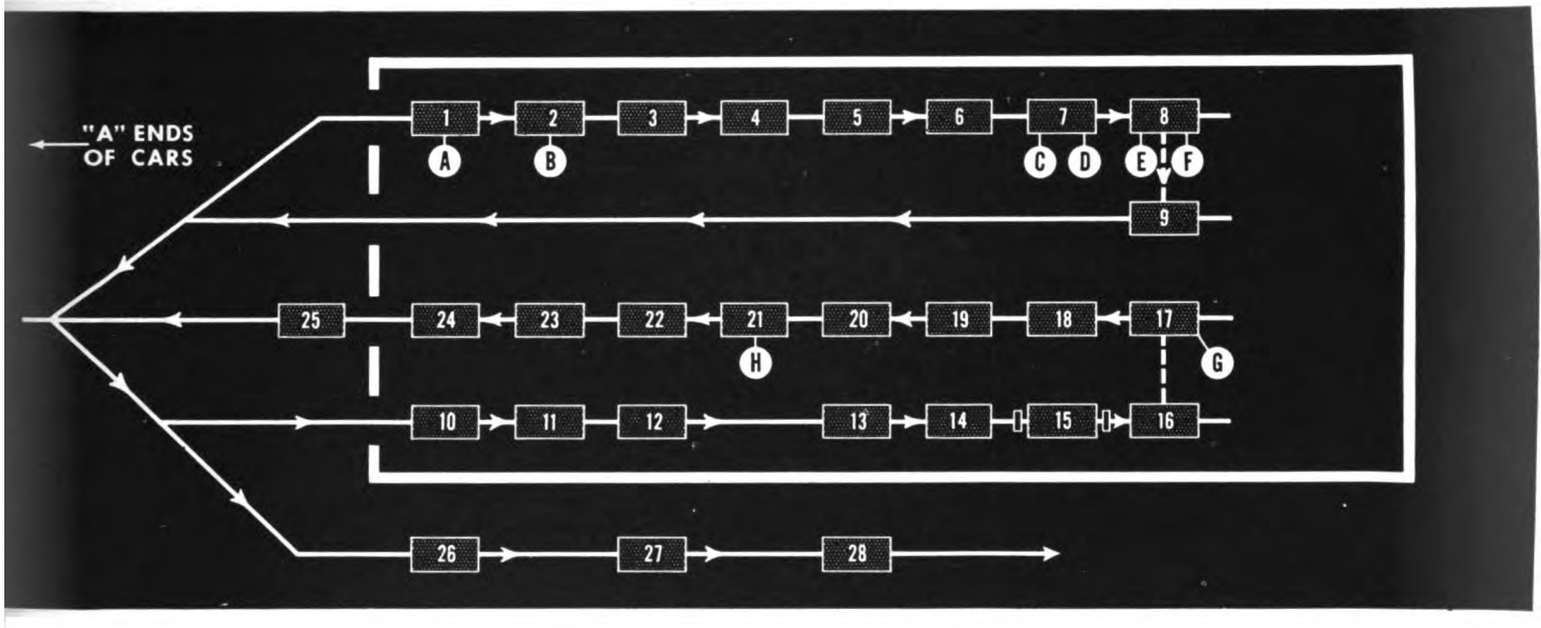
rginian's Car Shop

'he Virginian's Princeton, Va., car shop is a four-track ding in which the company has t and repaired all types of cars. current hopper building pro- n utilizes all of the shop track acity.

ight cars have been completed working day on the 28 position duction line. The Virginian does its own fabricating work, and has a separate shop at Princeton which handles center sills and other long structural sections.

Sides for the H-14 cars are assembled on jigs and pneumatic squeeze riveting is used for application of the side stakes, and top and bottom angles. All of the rivet heating in the shop is done with resistance-type rivet heaters. Jigs have been set up to permit all welding to be done in the downhand position. At the moment the railroad is doing no automatic welding.

All of the steps in the H-14 production line are described in connection with the schematic diagram of the car shop. Preparation and painting of car is done outside.



ASSEMBLY OPERATIONS

Punch and weld center sill Z's. Apply rikers, center fillers, slack adjuster, center ll spreaders, tie plates and hopper supirts. Fit up and ream. Rivet center sill sembly. Weld on side bearing brace supirts, weld center sill to striker castings, id weld on supports for cross ridges and wer floors.

Cut and bend bolster I beams. Apply end lates, bottom cover plates and reservoir racket in jig. Tack weld subassembly.

Assemble and weld crossbearer assembly. isemble cross ridge and crossbearer. Comete welding of entire subassembly.

Weld stiffeners on lower slope and hopper floor sheets.

Weld angle supports on upper floor and id sheets.

Apply side stakes, top bulb angle, and de sill angle to side sheets. Rivet entire ibassembly.

Build tracks.

Assemble door spreaders and locking rrangement on door plates. Fit up, ream, nd rivet doors.

SSEMBLY OPERATIONS

Place center sill asembly on shop trucks.

Apply bolster subassemblies, body side earings and braces, and A-end end sill.

3. Apply B-end end sill and all corner posts. Apply end posts, upper floor support legs and gussets, diagonal braces and other car-end components. Fit up B-end.

4. Fit up A-end. Weld bolster to bottom cover plate and weld bolster-and-center-sill gussets.

5. Ream and prepare underframe for riveting.

6. Rivet underframe.

7. Apply and fit up hopper and lower floor subassemblies, cross ridge and crossbearer subassembly, longitudinal hoods and inside hopper sheets, outside hopper sheets, side braces and door frames.

8. Apply and fit up upper floor and end sheet subassemblies, car subassemblies, and end top angles.

9. Set over to second set of shop trucks on adjacent track.

10. Apply placard boards, hand brake, brake step brackets and step, bell crank brackets and bell crank.

11. Align hopper floors and tack weld.

12. Align door frames and tack weld.

13. Tack weld entire car while squeezing it with air-operated hopper clamp and crank-operated side clamps. Complete welding of bolster and crossbearer cover plates. Apply pipe clamp brackets.

14. Weld hoppers, longitudinal hoods, cross ridges, inside hopper and floor sheets. Apply turn-over jig rockers.

15. Rotate car in turn-over jig. Seal weld seams between side sheets and end side sheets. Weld bolsters and hopper bottoms. Weld floor supports at cross ridge, floor support gussets at bolster and weld bulb angle to side sheets at side posts.

16. Remove turn-over jig rockers.

17. Set car body on completed trucks.

18. Ream car body and reapply key bolts.

19. Rivet door frames and center sill area through center of the car.

20. Rivet car ends including end sills, bolster ends, and sill steps.

21. Apply hopper doors and brake rods, levers, draft gears and couplers.

22. Apply AB valve, brake cylinder, reservoir, train line. Pipe brake cylinder.

23. Complete piping of brake equipment. Clamp train line and apply angle cocks.

24. Apply retainer and hoses. Make single car brake test.

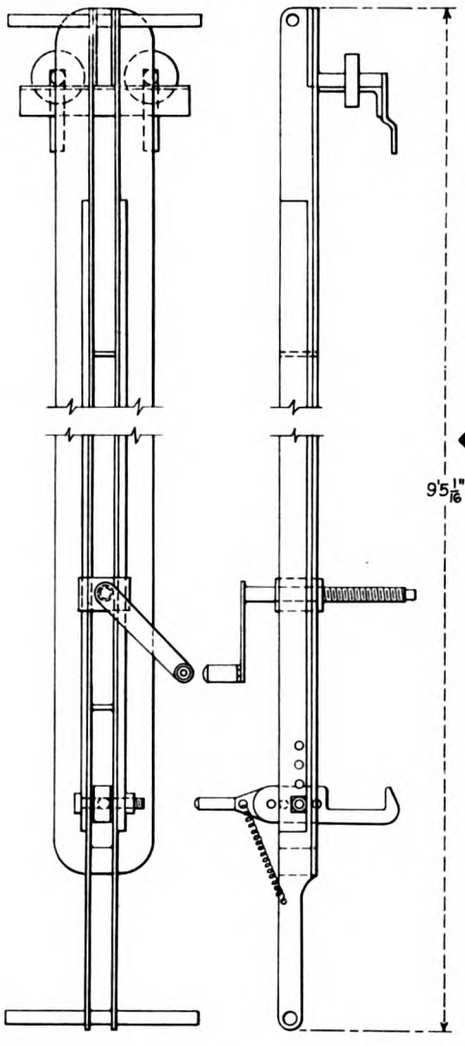
25. Steam and wash down car. Apply car cement to underframe and ends. Spray remainder of body with chromate primer.

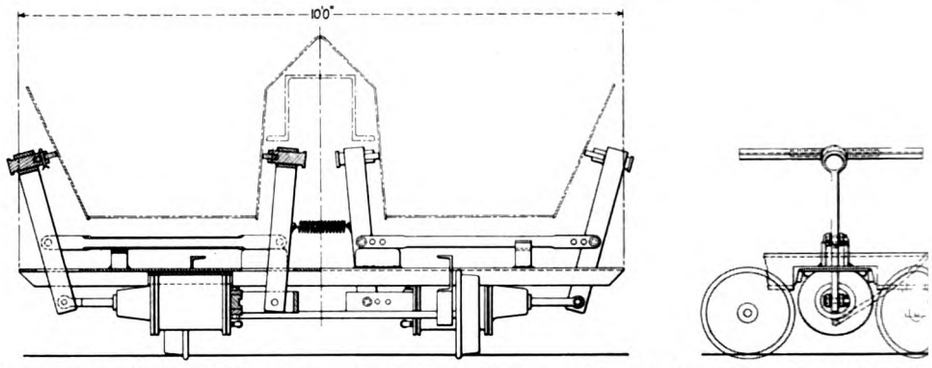
26. Spray first coat of body paint.

27. Spray second coat of body paint.

28. Stencil—majority is applied with spray.

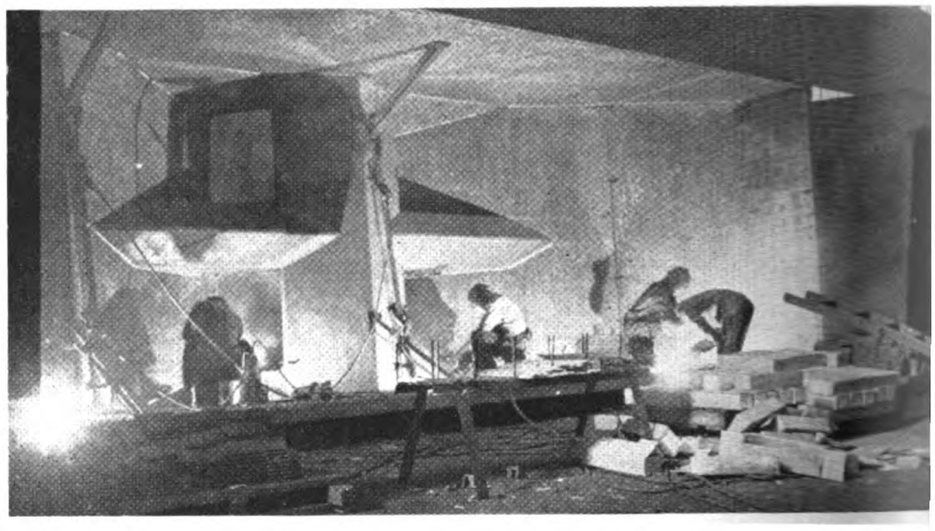
There's Lots of Welding in the H-14 Body





Hopper sheet clamping device is powered with two air brake cylinders and holds inside and outside hopp sheets against hopper floor for tack welding.

Jack to force car sides against floor for welding is tool used along production line to hold two com ponents in position for tack welding. Finish welding is done later.

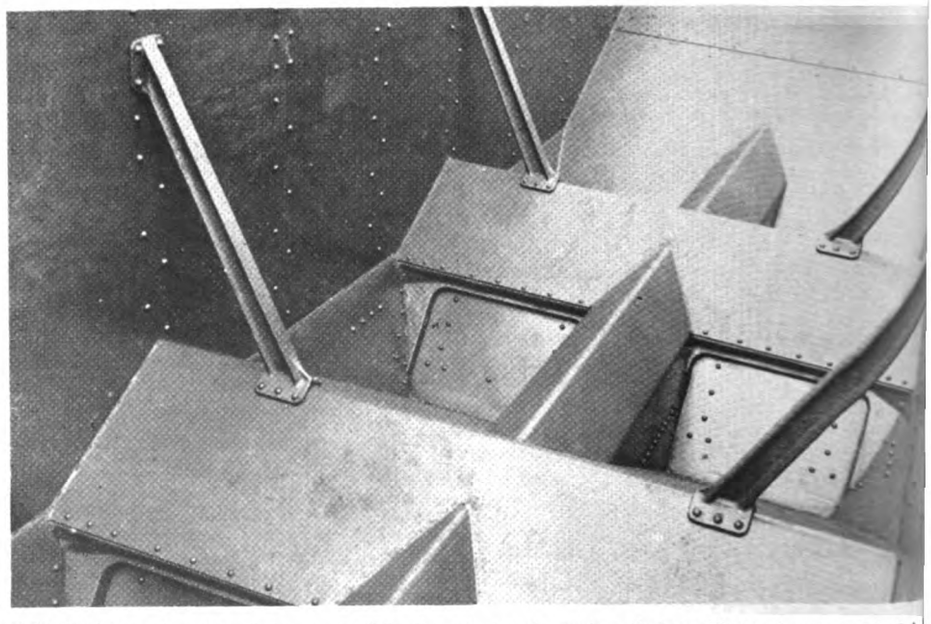


Downhand welding is possible at every step of the assembly. Here body is rotated on rockers attached to the ends of the center sill.

(*Continued from page 36*)

shear to transmit loads from the striking castings into the center sills, the Virginian now welds the strikers, as well as riveting them. This is possible because the striking castings are designed with lugs which line up with the ends of the webs of the center sill Z-sections. A gap is left which is filled by welding and this then makes the striker and center sill continuous. The conventional riveted connections are also used in applying these castings.

The completed cars each have a capacity of 2,573 cu ft level full. The body weighs 37,200 lb and the total light weight of the completed car is 54,200 lb. The Virginian is turning out what its experience, tests and calculations indicate should be an economical, rugged hopper car. Designs and materials were chosen to resist corrosion and impact, while keeping construction and maintenance costs at a minimum.

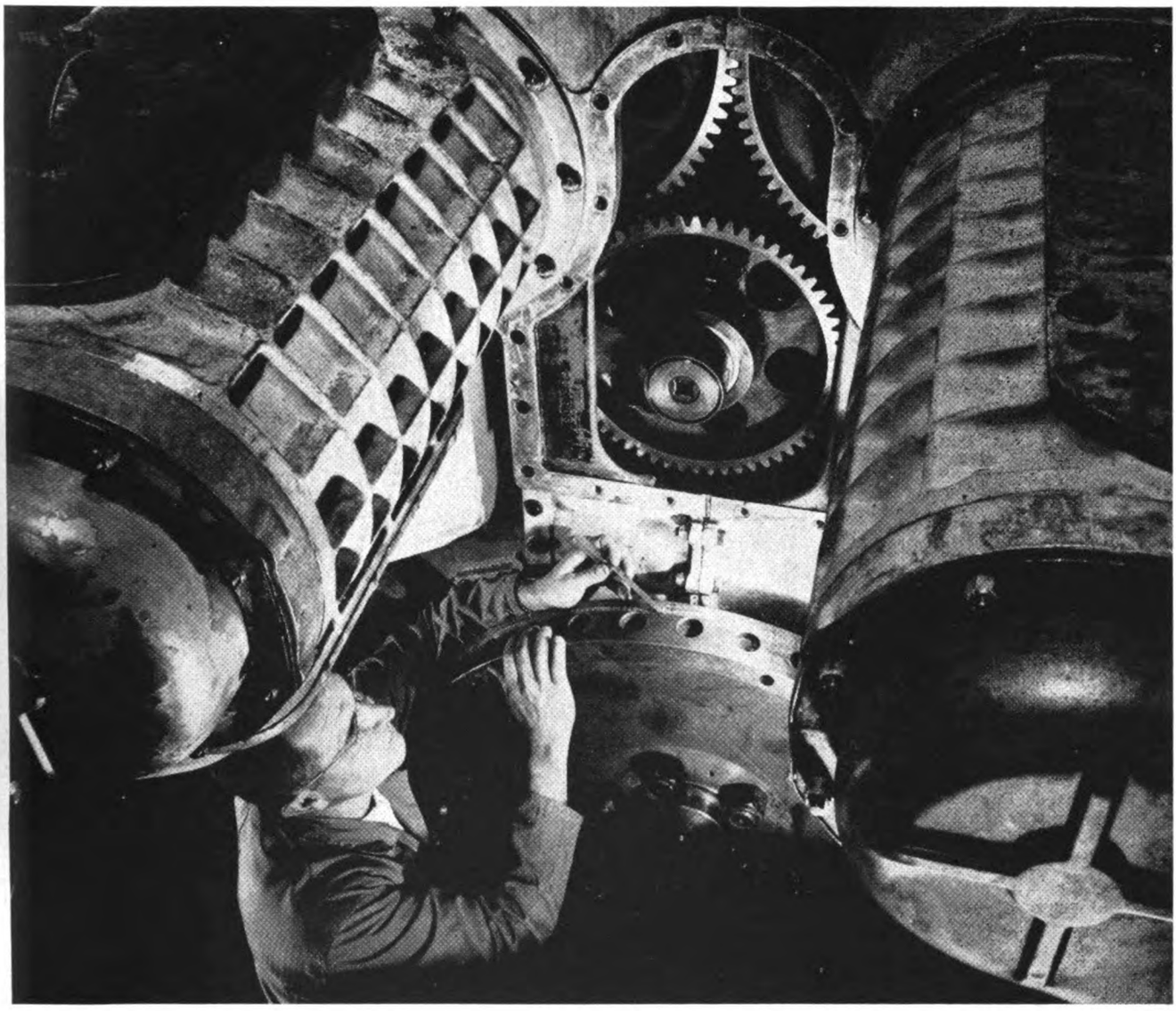


Welded joints and as few holes as possible characterize the bodies of these 70-ton hoppers. All of the plates contacted by the lading (and visible here) are Cor-Ten steel.

ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL RR

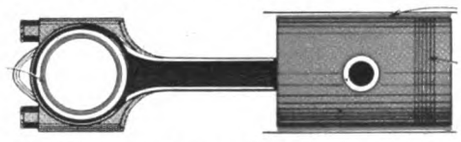
FIRM NORTHERN PACIFIC RAILWAY
South Tacoma, Wash.



RR diesel gears show only ½° wear in 2½ million miles

Timing gears on this Northern Pacific GMC-diesel locomotive engine, lubricated with RPM DELO Oil RR, recently completed 2½ million miles of severe freight service without repairs or adjustment. NP's South Tacoma Shop Foreman, A. R. Genin (above), indicates degree marks on engine flywheel, used to gauge gear wear. Tolerance between gear teeth shows variance of just ½° from original setting. Mr. Genin says, "We consider this low rate of wear remarkable for heavy-duty freight operation. It is typical of our experience during the 12 years we have used RPM DELO Oil in all our locomotive diesels." Engines are 1350 h.p. 16-567 series.

Why RPM DELO Oil RR reduces wear, corrosion



• Oil stays on engine parts—hot or cold, running or idle • Anti-oxidant resists lacquer formation • Detergent keeps parts clean • Special compounds prevent corrosion of bearing metals • Inhibitor resists foaming.

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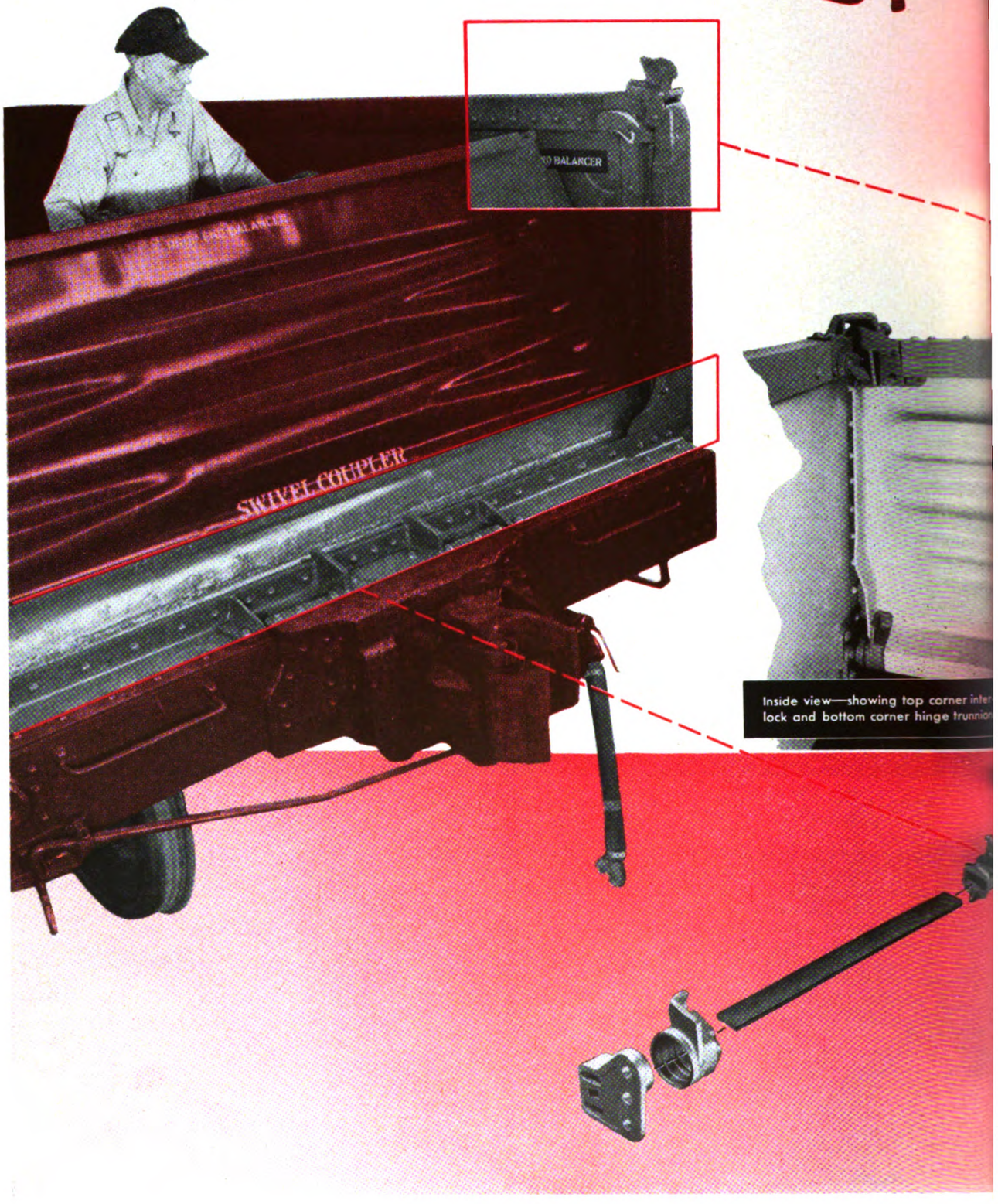
Spee

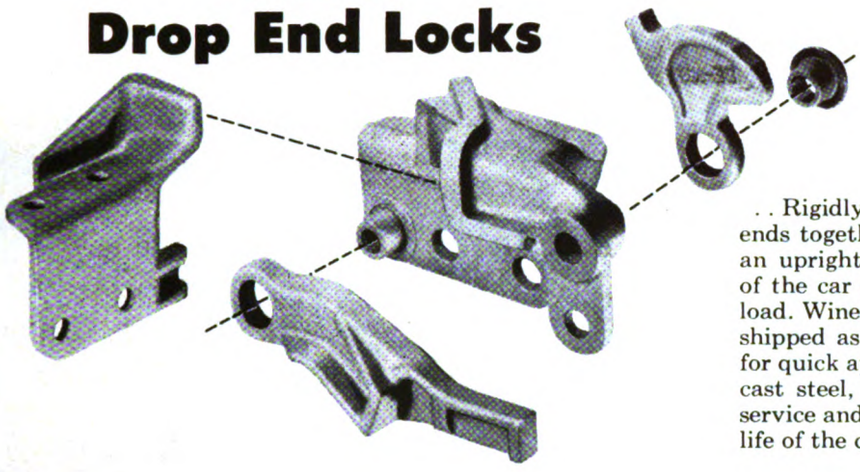


Inside view—showing top corner inter
lock and bottom corner hinge trunnion

ervice.. Sustain Structure

For outstanding economies . . . increased safety factors . . . improved strength and durability for the life of the car—Wine Drop End Units (Locks and Balancers) form *the perfect* combination!

WINE
Drop End Locks

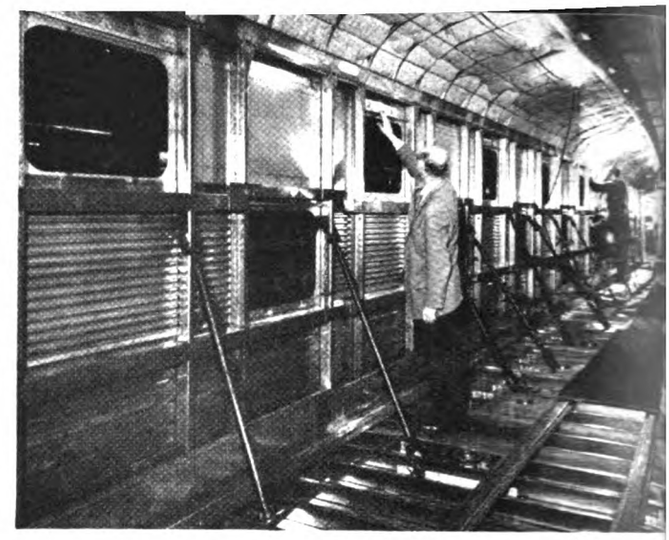


. . Rigidly interlock gondola sides and ends together—securing the ends in an upright position. Top corners of the car cannot spread regardless of load. Wine Drop End Locks are shipped as an assembled unit, ready for quick application. Made of electric cast steel, they insure maximum service and durability throughout the life of the car.

WINE
End Balancers

. . . Eliminate the necessity of using *four or five men* to close a drop end for car loading! Multiple spring steel torsion bars, incorporated between the center casting and the two outer hinge trunnion castings, permit *one man* to readily close the heaviest drop ends without assistance. Available for easy application on most drop end gondolas.

Slumbercoach weight of 141,000 lb can be compared with the 121,500 lb weight of conventional 60-passenger coach. B&O owns two.



Stainless steel structure for these new cars is of the regular Budd design despite their radical interior arrangement.

Slumbercoach: 40-Passenger Room Sleeper

In the fall of 1956, the Burlington received the first four Slumbercoaches. Recently the B&O has been the second US road to put these cars in service. Budd delivered them from its current production run. The cars have capacity for 40 passengers in both day and night service. Key to high sleeper capacity is the split berth arrangement making it unnecessary to have a 6-ft vertical wall for the bed. This makes possible a very compact interlocking of adjacent rooms. Each room has complete toilet facilities, but all accommodations are less elaborate than those of conventional roomette cars.

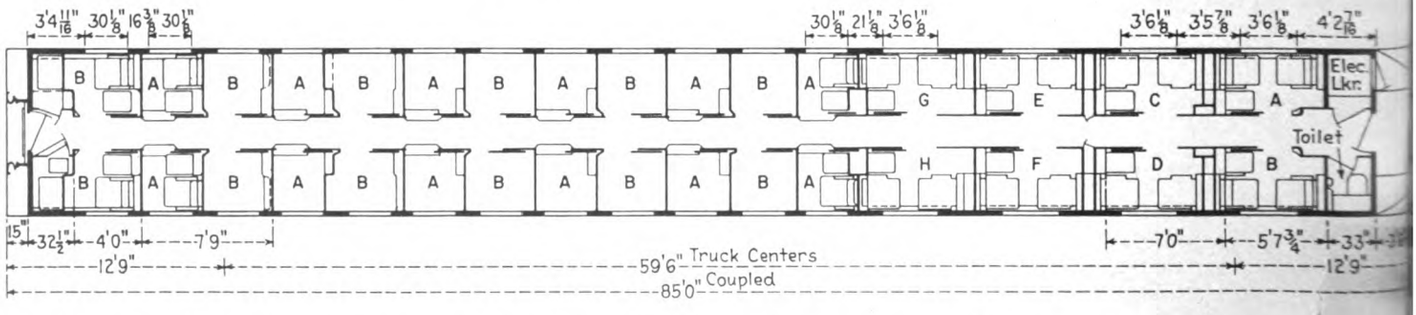
High passenger capacity of these cars has made it possible for both the B&O and Burlington to offer this sleeper service at coach fares with a modest charge for the room accommodation.

Fiberglass-reinforced plastic moulded room shells are in two halves. Each portion is completely trimmed before installation.

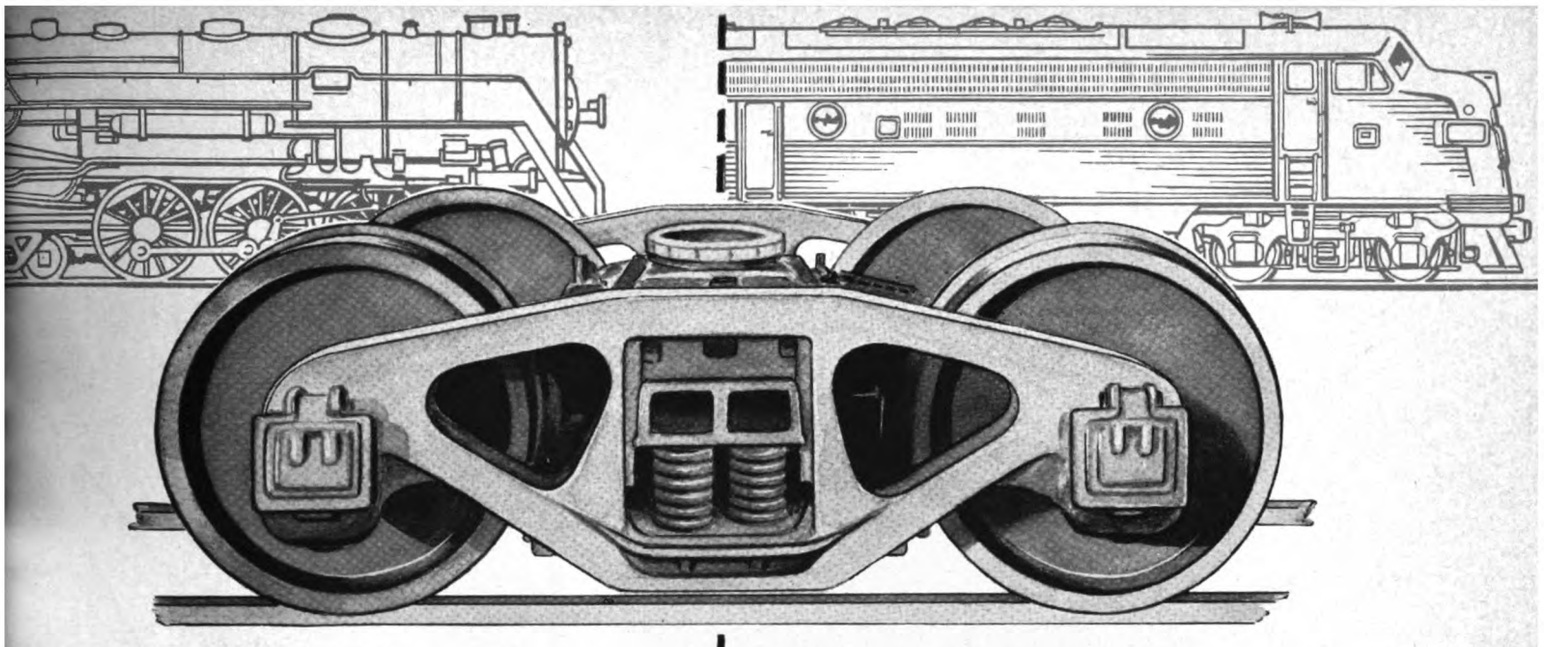
Half-room assemblies fit into the car shell. Single rooms are of two types—an upper two steps above aisle; lower at aisle level.

Partial List of Supplies

Bethlehem Steel Co.	Wheels and axles
Crucible Steel Co.	Truck springs
Fabreeka Products Co.	Pads
General Steel Castings Corp.	Truck castings
Houdaille Industries	Shock absorbers
SKF Industries	Bearings
National Malleable & Steel Castings Co.	Yokes, couplers
Waugh Equipment Co.	Draft gear
Youngstown Steel Car Corp.	Underframes
National Brake Co.	Hand brakes
Westinghouse Air Brake Co.	Air brakes
Adams & Westlake Co.	Curtain fixtures, window sash
Gustin-Bacon Manufacturing Co.	Insulation
Heywood-Wakefield Corp.	Bedroom seating
Morton Manufacturing Co.	Inner diaphragms
U. S. Plywood Corp.	Micarta-covered panels
Gould National Storage Battery Co.	Batteries
Luminator, Inc.	Light fixtures
Safety Industries, Inc.	Generators and controls
Dana Corp.	Spicer drives
Westinghouse Electric Corp.	Fans, Relays, Circuit breakers
Anemostat Corp. of America	Anemostats
Barber Colman Co.	Grilles
Trane Co.	Air conditioning
Barco Manufacturing Co.	Steam conduit
Crane Co.	Hoppers
Vapor Heating Corp.	Heating equipment



Lower level single rooms are designated "B", upper level singles are "A", and right end of car has eight double rooms with upper and lower berths.



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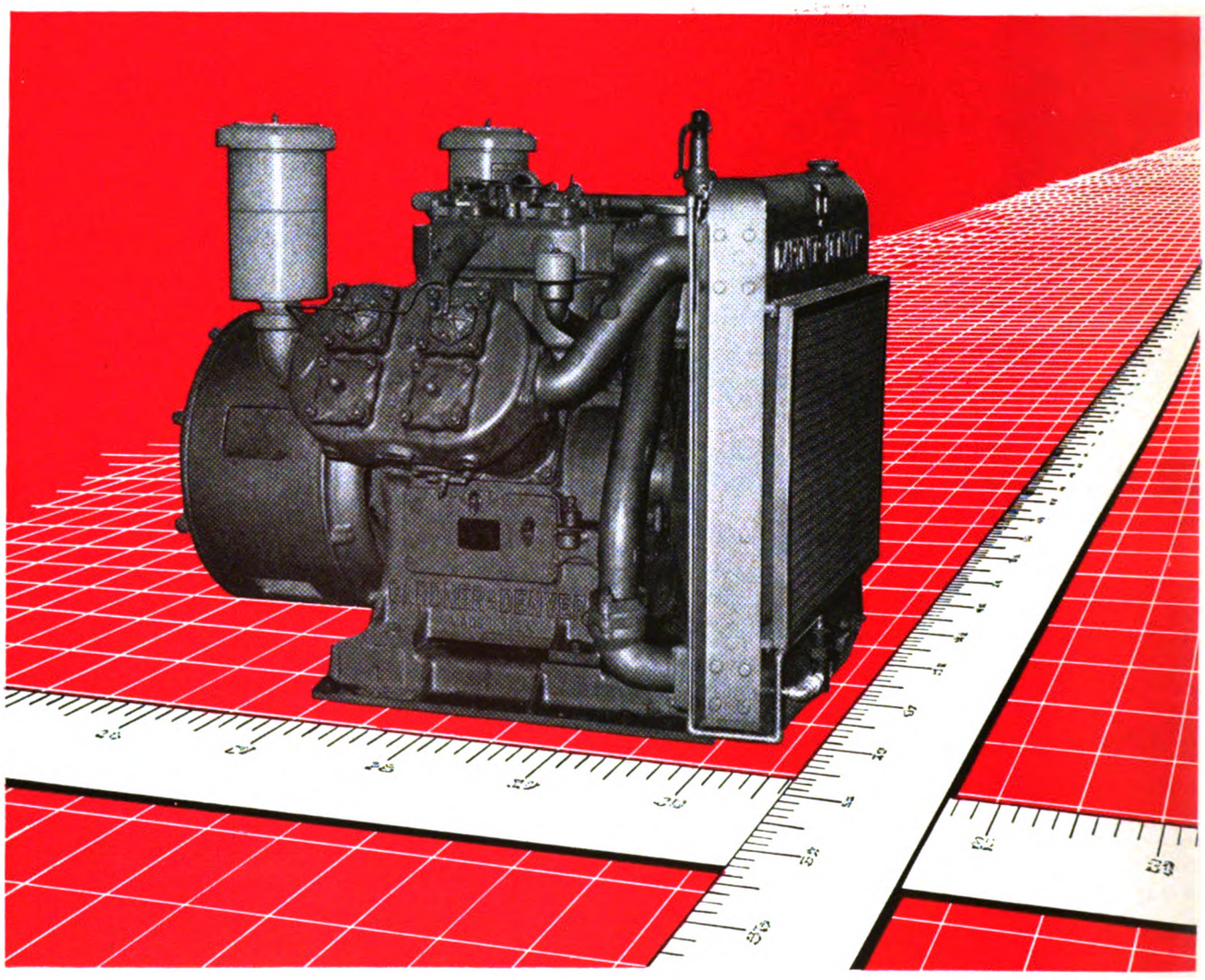

Made to the measure of smaller space— this high-capacity Gardner-Denver compressor

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The Gardner-Denver WBN needs no special base. Just bolt it down, hook it up and put it to work. It is available with a self-contained radiator-intercooler that conserves cooling water, or with a tube-type intercooler.

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t-RL Brake Equipment *Installment 1H*

IS-24-M Pressure Maintaining Brake Valve

his is the eighth installment on the t-RL Equipment in the Color Sche- atics series. For the 1G installment e Page 37 of the November, 1957, sue.

laintaining Cut-Off Valve onnections in Running Position ketch 21)

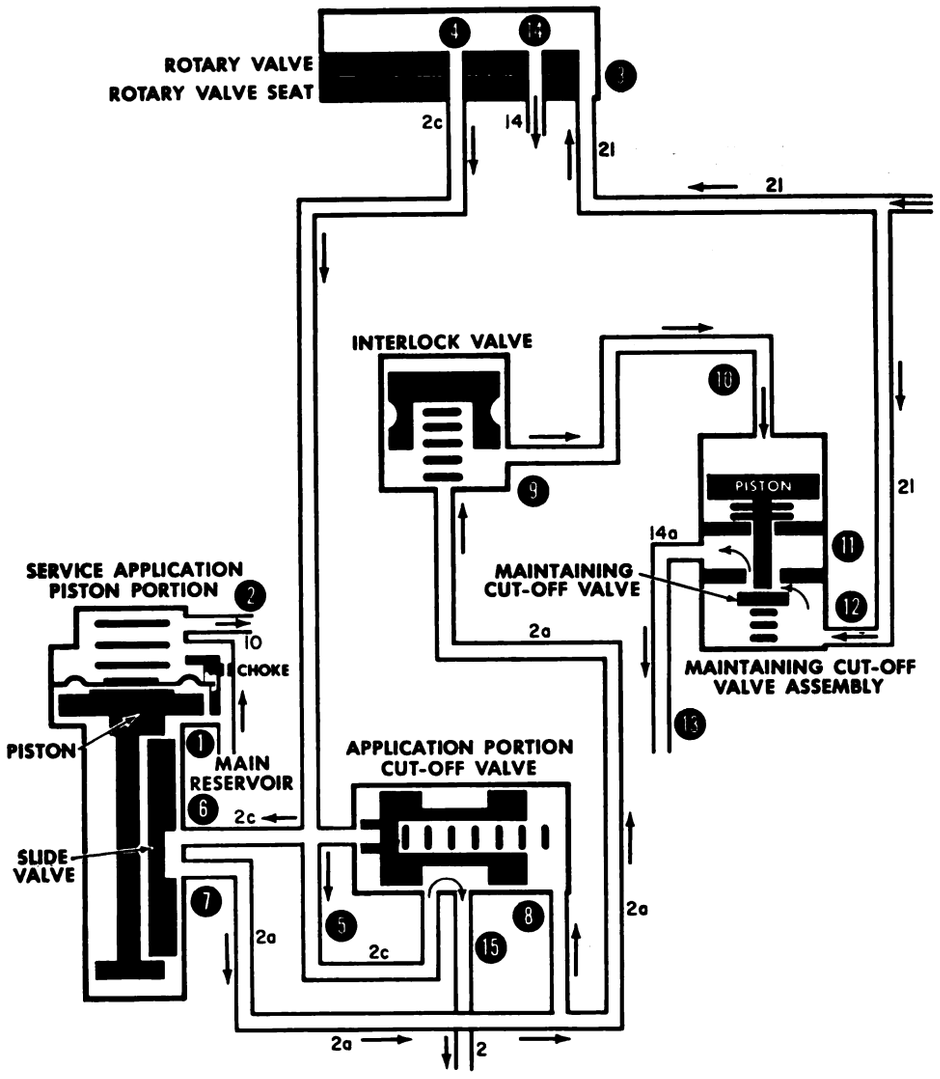
This schematic has been made up to ow the relation of the Pressure Main- ining Feature to the rotary valve, ap- lication cut-off valve, and the service pplication piston and slide valve. The qualizing piston portion is not shown.

Air from feed valve passage *21* flows o the space above the rotary valve. rom there the air flows through pas- age *2c* to the left face of the cut-off alve piston and through the service ap- lication slide valve into passage *2a* eading to the spring end of this piston. Vith air balanced on both faces of the iston, the piston spring moves the pis- on to permit passage of air from pas- age *2c* to *2*, and to the brake pipe. Air low continues through passage *2a* to the hamber below the interlock piston alve. With the valve in *IN* position, air s permitted to flow to the chamber bove the maintaining cut-off valve pis- on.

The piston is moved downward, and ts stem contacts the cut-off valve which s unseated in this movement. Feed alve air from passage *21* is then free o flow past the open cut-off valve to assage *14a* which leads to the main- aining valve of the equalizing piston ortion (not shown).

At the service application piston and lide valve assembly, main reservoir air goes through a passage to the space elow the application piston, and hrough a choke to the spring chamber bove the piston. With the pressures qualized, the spring moves the piston to its down position. Main reservoir pressure also flows from above the pis- ton to the safety control system (not shown) through passage *10*.

To color sketch *21*, begin with a carmine pencil and fill in the main res-



Sketch 21
Maintaining Cut-Off Valve Connections in Running Position

1. Main Reservoir air flows to spaces above and below application piston.
2. Flow continues from the space above the piston to passage *10*.
3. Feed valve air goes from passage *21* to the space above the rotary valve.
4. Feed valve air continues through the rotary valve and seat to passage *2c* . . .
5. . . . And continues to the left of the cut-off piston and to the opening in the center of the piston.
6. Air also passes through passage 2c to the cavity in the slide valve . . .
7. . . . And from the slide valve cavity to passage *2a*.
8. The flow continues from *2a* to the right of the cut-off piston . . .
9. . . . And from *2a* to the space below the interlock piston valve.
10. From the interlock piston chamber, it continues to the space above the maintaining cut-off piston.
11. The piston moves down, unseating the maintaining cut-off valve.
12. Feed valve air from passage *21* flows past the open valve to passage *14a* . . .
13. And continues through passage *14a* to the equalizing piston portion (not shown).
14. Feed valve air goes through the rotary valve and seat to passage *14* . . .
15. . . . And from the center of the cut-off piston to passage 2 and to the brake pipe.

ervoir passage, the spaces above and below the application piston, and passage *10*. Dampen with a small brush and let dry before proceeding. With an orange pencil, fill in the space above the rotary valve, passage *21*, the space above and below maintaining cut-off valve, and passage *14a*. Fill in passage *14* through the rotary valve and seat, and through passage *2c* to the point where the rotary valve contacts its seat. Dampen and let dry.

With a yellow pencil, start in passage *2c* at the point where the orange color left off (at the rotary valve seat). Complete filling in this passage, and color the space at left end of the cut-off piston continuing through the opening in the piston to and including passage *2*. Continue with the yellow color in passage *2c* into the slide valve cavity and into passage *2a* which must also be colored to and including the following: spring end of cut-off piston, spring end of interlock valve, and the chamber above the maintaining cut-off valve piston. Dampen and let dry.

Automatic Cut-Off of Pressure Maintaining (Sketch 22)

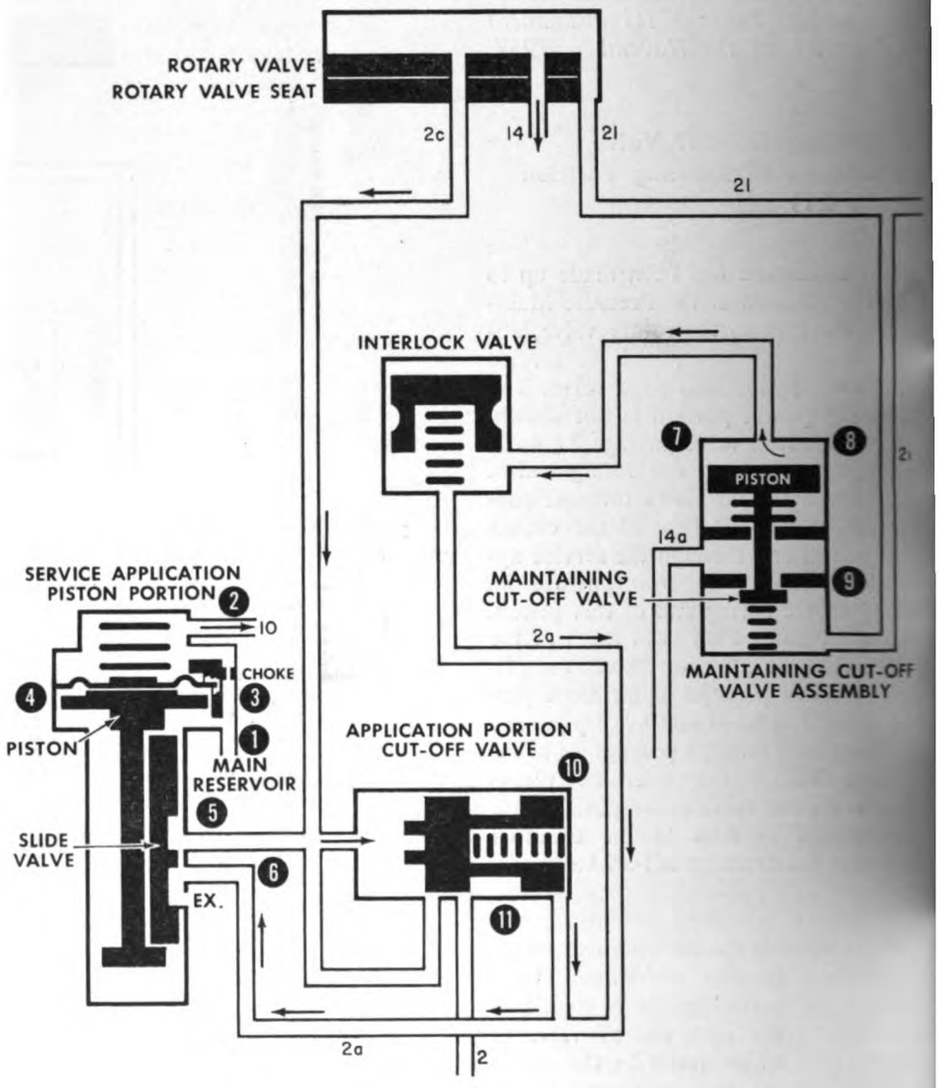
When a reduction in pressure takes place in the No. *10* line (safety control system), then a reduction occurs in the chamber above the service application piston at a rate greater than can be made up through the choke. The piston and slide valve move to the upward position. The slide valve in this position disconnects the feed valve supply to passage *2a* and connects this passage to atmosphere through the *EX*. With passage *2a* connected to atmosphere, chamber pressure at the spring end of the cut-off piston is reduced proportionately, with the result that supply pressure at the opposing end of the piston moves the piston to the right, cutting off supply to brake pipe passage *2*.

The air above the maintaining cut-off piston, now connected to passage *2a*, also passes to the atmosphere, with the result that its spring moves that piston upward. The piston stem moves away from contact with the maintaining cut-of valve which permits its spring to close the valve. This cuts off supply from feed valve passage *21* to passage *14a*, and stops further pressure maintaining.

To color Sketch *22*, proceed as follows: With a carmine pencil, fill in main reservoir passage to the choke and the space below the service application piston. From the choke, color in carmine dashes the space above the piston and passage *10*. Dampen and let dry.

With an orange pencil, fill in the space above the rotary valve, passage *21*, and the space beneath the maintaining cut-off valve. Color in orange dashes the space above the maintaining cut-off valve and passage *14a*. Fill in passage *2c* through the rotary valve and seat, the space at the left end of the cut-off piston and the cavity in the slide valve. Carry the color in this passage to the point where it is cut-off by the piston. Fill in passage *14* through the rotary valve and seat. Dampen and let dry.

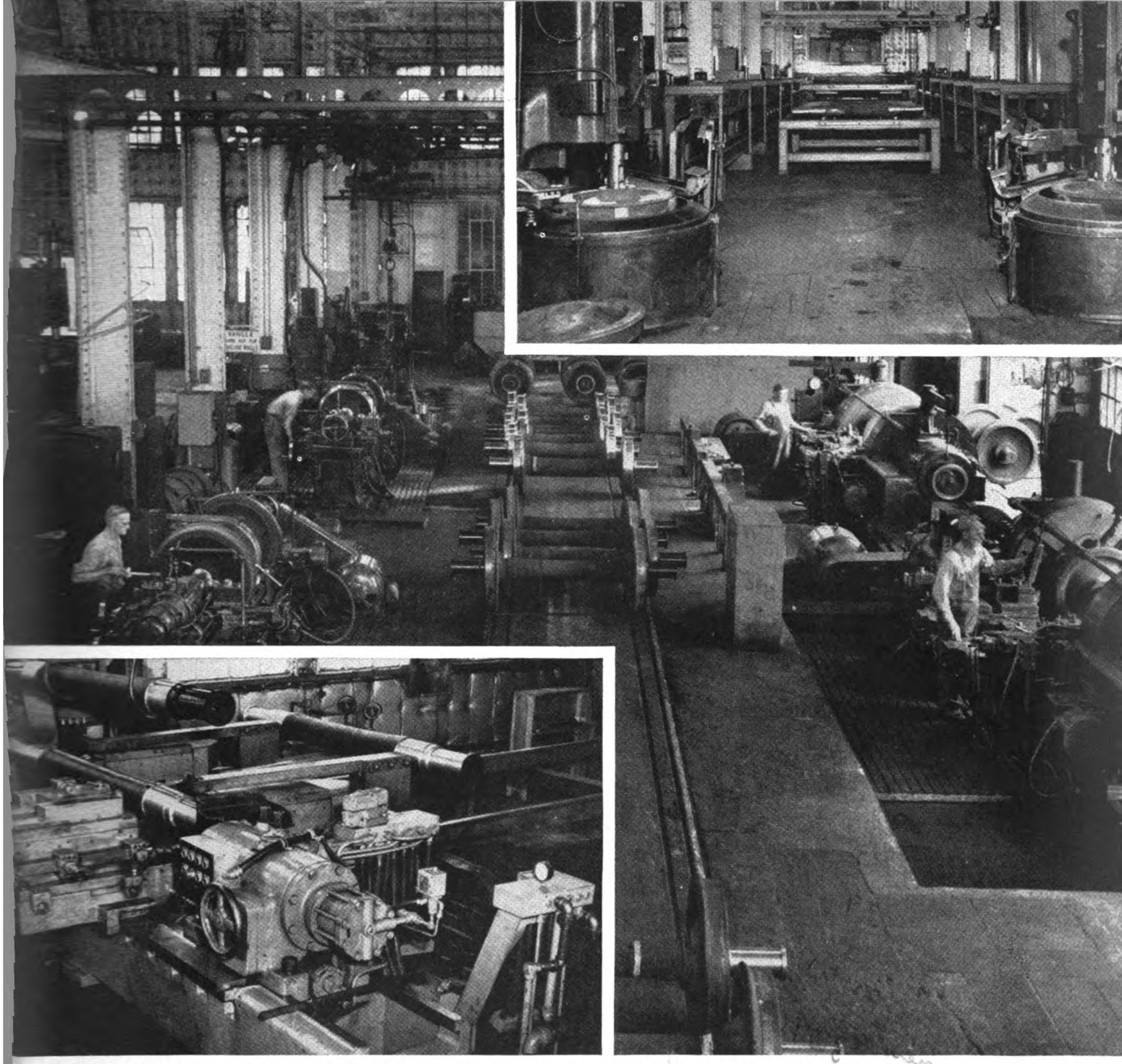
With a yellow pencil, fill in passage *2*. Fill in with yellow dashes the space above the maintaining cut-off piston, the passage, the space beneath the interlock piston, passage *2a* through the application slide valve to *EX*, and the chamber at the spring end of cut-off piston. Dampen and let dry.



Sketch 22

Automatic Cut-Off of Pressure Maintaining

1. Main reservoir air flows to space above and below the application piston.
2. Air pressure in the safety control system has been reduced.
3. Main reservoir air cannot flow through choke at a rate to compensate for the reduction above the application portion piston.
4. Greater pressure beneath forces piston to its upward position.
5. The piston carries the slide valve with it.
6. The slide valve cavity connects passage *2a* to exhaust *EX*.
7. Air above the maintaining cut-off piston escapes past the interlock valve and through passage *2a* and the slide valve to exhaust *EX*.
8. Piston is forced upward by its spring permitting cut-off valve spring to seat the cut-off valve.
9. Feed valve air cut-off is closed by the cut-off valve, which stops pressure maintaining.
10. Loss of pressure at the right of the cut-off valve piston causes it to be forced to the right by the supply pressure on the left.
11. Movement of this piston cuts off supply from passage *2c* to passage *2* (brake pipe).



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Norfolk and Western's Roanoke shops exemplify the completeness of the Niles machine tool line

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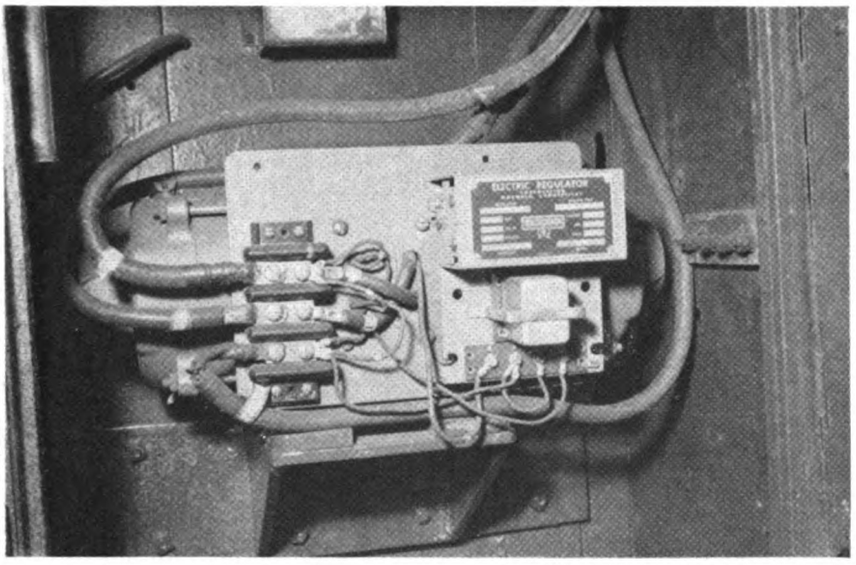
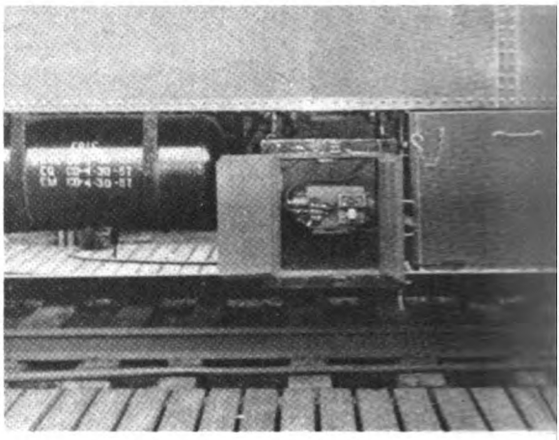




At left: The set which is suspended under the car body is easily available for inspection.

Above: The lamp regulator is mounted in a cabinet under the car frame alongside the battery box.

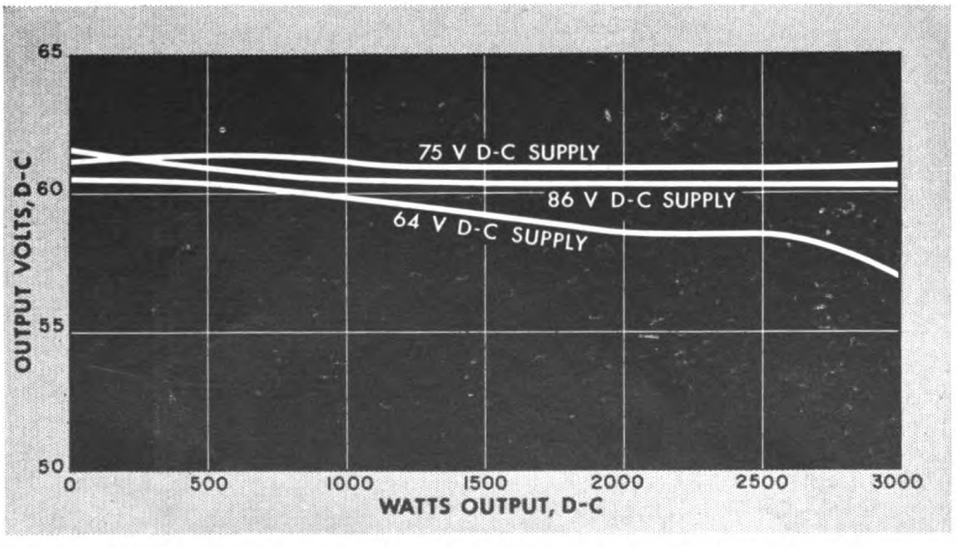
M-G Lamp Regulator Is Highly Efficient

DEVELOPED ON THE ERIE, a motor-generator type of lamp regulator for railway passenger cars has now been made available by the General Electric Company. It is suitable for use with either lead-acid or nickel-iron storage batteries. Its voltage output when used on unregulated voltage supply is indicated by the curves. The machine is rated 2,200-watts at 60 volts output. The test curves are carried beyond rated load to indicate performance under all conditions.

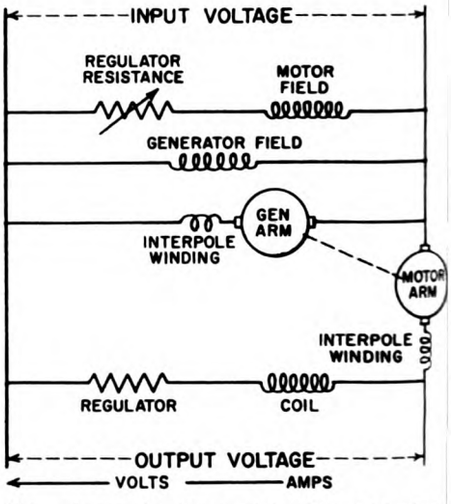
The regulator is a motor-generator. The motor is connected in series with the load and the generator is in parallel with the load. The two units are connected mechanically on the same shaft.

The d-c motor operates on the differences between the input and the output voltages. The generator, which is driven by the motor, feeds power back into the line. This results in high-efficiency performance since no power is dissipated in an external resistance. A finger-type regulator controls the motor shunt field strength to produce constant output voltage.

The unit weighs 80 lb and has an overall length 19 in. Mounted as shown in the illustration, the overall height is 8½ in. and the depth, front to back is 10½ in.



The curves show the output voltage throughout the load range for three values of voltage input.



Wiring diagram for the regulator. The dotted line indicates the shaft connection between the motor and generator.

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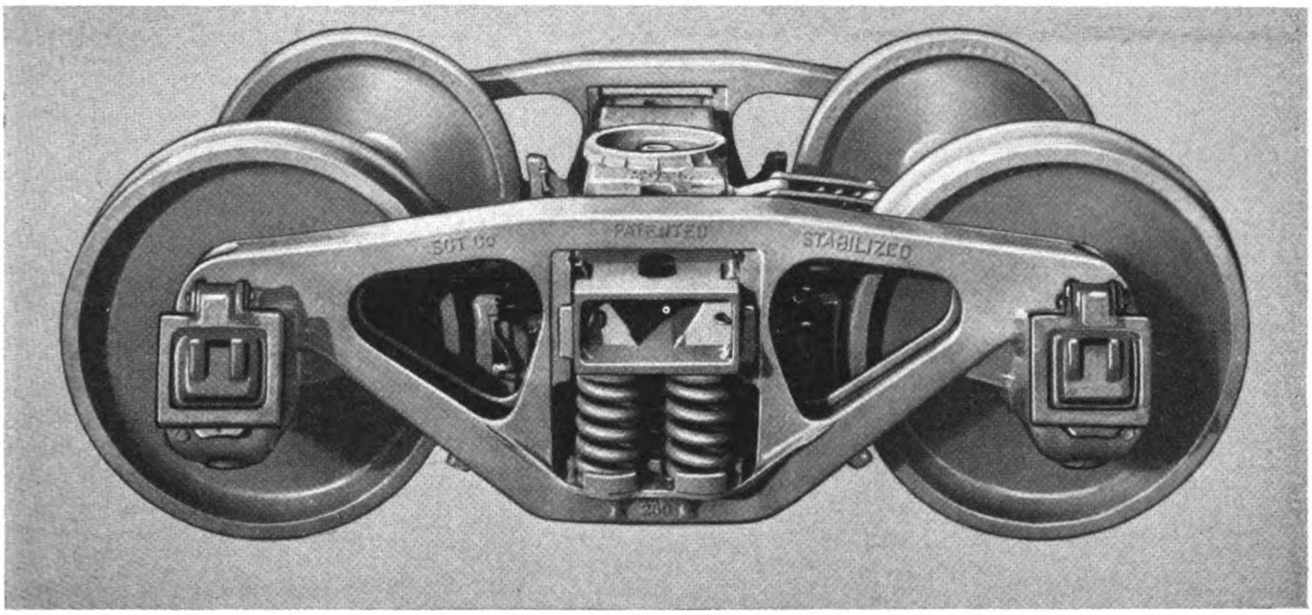

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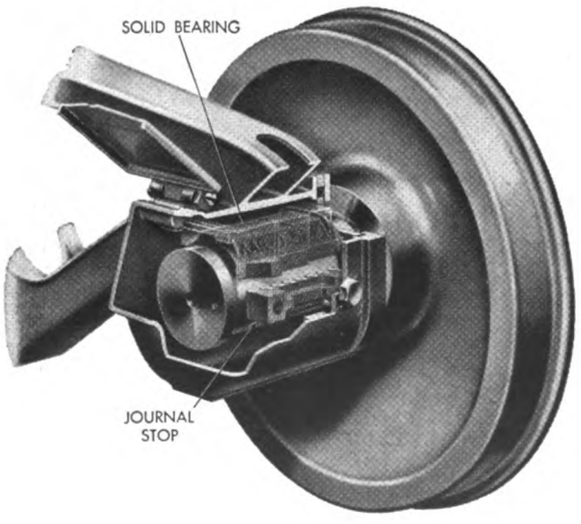
Standard Car Truck Company, 332 South Michigan Avenue, Chicago 4, Illinois. *In Canada:* Consolidated Equipment Company, Ltd., Montreal 2, Quebec.

It's a fact...

that MAGNUS R-S JOURNAL STOPS can cut total bearing operating costs to less than 13 cents per car day!

Here's the low-cost way to get better bearing performance fast—save almost $35 per year now on every freight car equipped with Journal Stops



Railroads using R-S Journal Stops today save about $35.00 per car year in reduced operating costs alone —fewer hot boxes, longer bearing and axle life, and reduced service attention. They save the complete cost of the R-S Journal Stops, including installation, in less than 3 years — bring the total cost of solid bearing operation down to less than 13¢ per car day.

That's just one of the facts about low-cost solid bearings with R-S Journal Stops — proved now on over 5000 cars in service. Potential savings are even greater. That's because R-S Journal Stops stabilize the bearing assembly, give the low-cost solid bearing a chance to work at optimum efficiency. That cuts truck maintenance costs all along the line. It

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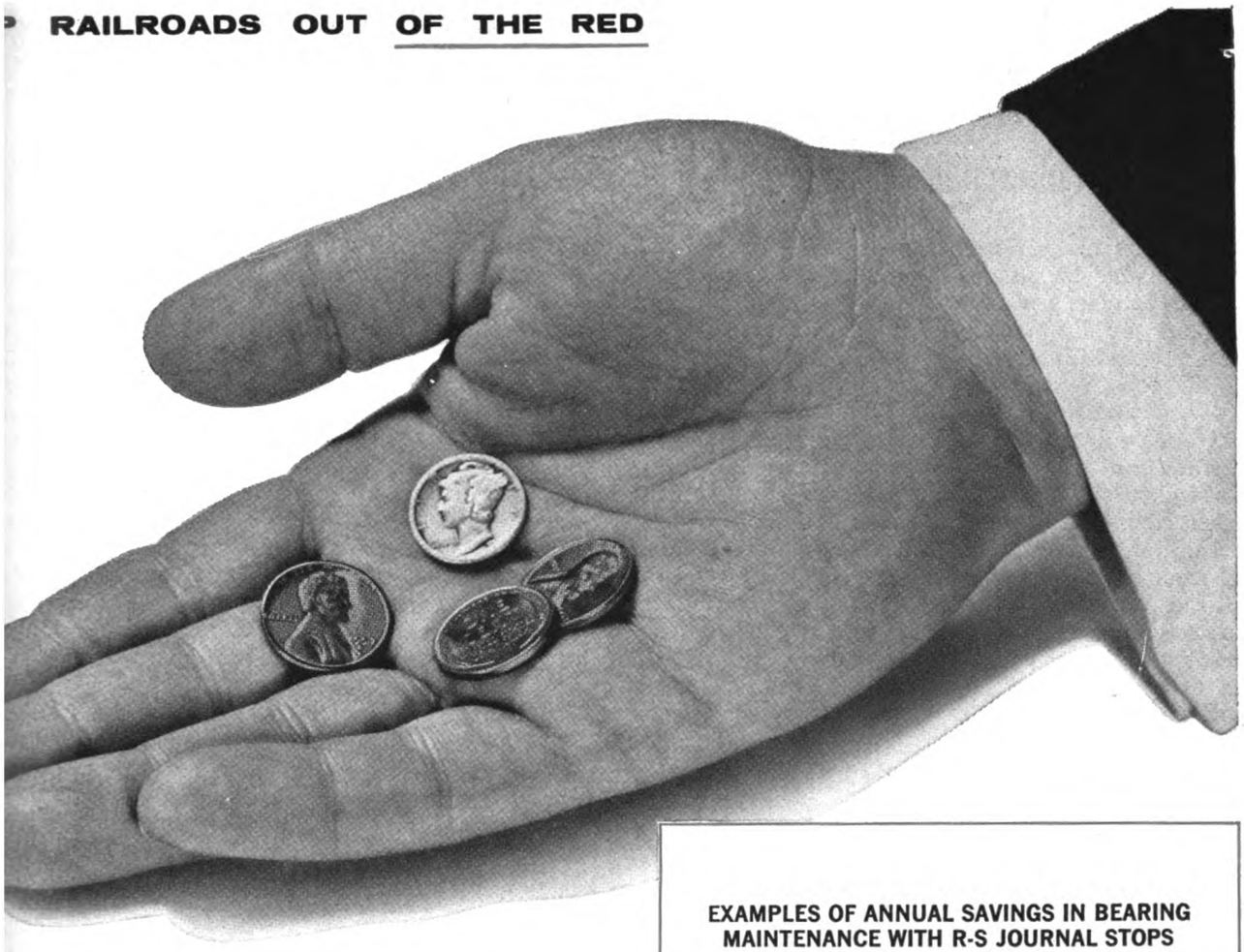

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l reduces the requirements for an effective rear
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Description	Without Stops	With Stops	Savings
Repairing Hot Box Set-Outs ...	$9.05	$0.91	$8.14
Damage to Equipment	2.01	.20	1.81
Fires Due to Hot Boxes	.29	.03	.26
Cut Journals	1.35	.34	1.01
Defective Brgs., Routine Insp. .	2.69*	1.35	1.34
Routine Yard Inspection	40.82	24.11	16.71
Material—Not Included Above			
Defective Bearing Replacements	4.36*	2.18	2.18
New Axles	3.35	.84	2.51
Spring Packing Retainers	.46	.00	.46
		TOTAL SAVINGS	**$34.42**

**Technical Advisory Committee figures. Other figures in this column based on 1954 costs as determined by AAR.*

MAGNUS

Solid Bearings

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... In performance ... in cost

diary of **NATIONAL LEAD COMPANY**

HOW MUCH DO YOU KNOW ABOUT BRUSHES?

Some After Thoughts

THERE'S A SONG that has a line in it—"Don't monkey with Mr. In-Between." The brushes on main generators and traction motors are the Mr. In-Betweens of the diesel-electric unit. They conduct all of the power which these units develop. When operating conditions are changed, it's a pretty safe bet that brush performance will change. When people know they may be exposed to some contagious disease, they usually go to a medical doctor for council and help. It would seem logical that some responsible railroad person should seek the guidance or help of a brush representative when that railroad contemplates changes of a nature that may affect brush performance. There are innumerable so-called experts who make indiscriminate brush grade recommendations without sufficient knowledge of brush grade variables and operating variables. These are the *experts* who cost railroads dearly, in trouble and maintenance. However, today most railroad users of brushes are making effective use of the service available to them from reliable brush producers to reduce the hidden costs of improper brush grade application.

This seems to be a good place to make a point aimed at saving some maintenance money. On a large railroad system equipment is usually operated over several divisions, each being concerned principally with performance on their own division. It may be true that a file of equipment maintenance is available for each unit, motor, or generator, as the case may be.

However, if these records are ancient history by the time they are accumulated, one means of cutting operating costs is lost. A unit may have been in trouble several times for the same reason, but with an up-to-date all-points record, there is no tie-in with that unit's system-wide performance.

This writer knows of one case where a single unit destroyed over eight armatures in the same motor position over the system and, because of the age of the motor, the real trouble was not uncovered until the unit failed for the third time in one particular division. Armatures do fail and without adequate correlation of the complete performance picture for a given unit, there was no other way for any given division to realize the unit in question actually had something seriously wrong in the electrical circuits. The relation of this point to brushes lies in the fact that such a record would also give an excellent performance picture for brushes on a given railroad. If no armatures are being turned down or reconditioned, the brushes must be doing their commutation job. If armatures are requiring abnormal attention, the record would serve as factual evidence to that effect thus helping to eliminate the need for decisions to be made on an opinion basis. It is not enough to know that so many motors are being sent in for overhaul per month. Lack of performance record makes a happy hunting ground for the vendors of products which are sold by glib-talking salesmen rather than by the hard dollar record or product performance.

In closing this series of questions and answers, the writer would like to add one more statement. I have been frequently asked, "What is the greatest single source of commutation trouble on traction motors and generators?" The answer is one word: *DIRT*. Keep them clean and they will repay you in longer, trouble-free service.

By K. R. MATZ
National Carbon Company

This is the concluding article in the series of questions and answers on brushes.

From the Diesel Maintainer's Note Book

The Engine Ran Without Fuel

By Gordon Taylor

WHEN AN EMD SWITCHER was turned in after a three-day tour of duty, the engineman reported everything to be in good order, except the radiator shutters which would not open. Fortunately, the weather had been so cold that there had been no trouble from overheating the engine.

The first thing that the maintainer did was to check the temperature control switch. He found no power or voltage at that location. The temperature control or shutter control is fed from the fuel pump circuit, so the maintainer went up to the cab. There he found the control switch closed, but the fuel gage showed zero. He then went out to look over the fuel pump and found it dead, so he moved back to the cab and found the fuel toggle switch in the *off* position. The switch was snapped to the *on* position and everything worked okay. That is, the fuel pump would operate and the temperature control switch was energized.

He was glad that the shutter control question was settled, but he was upset by the new question. How and why was the engine running for three days with the fuel pump dead and not supplying fuel to the engine? The shutter control had been giving trouble for three days, so it could be assumed that the fuel pump had been shut down the same length of time.

The maintainer now had a mystery on his hands. He shut down the engine and then started it up in the regular manner by turning the fuel pump switch on. After the engine had run for several minutes, he shut the fuel switch off and the engine continued to run, just as it had done in service.

The next morning several maintainers decided to get the answer to the riddle and after starting the engine with the fuel pump running, they turned the switch and turned the fuel pump switch off. The

(*Continued on page 64*)

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

Over $100,000 a year can be cut in passenger terminal operating costs

by Standard's Wheel Truing Machine

$129,140 a year *saved*—over $350 a day. Look at this analysis, made by a leading railroad during recent installation, of the savings to be realized through the cost-reducing performance of Standard's Wheel Truing Machine:

WHEEL TRUING MACHINE SAVINGS ANALYSIS

DIRECT SAVINGS—ANNUAL

(Based on actual passenger car wheels removed during last 6 months of 1957 by reporting railroad)

Total Wheels Changed	2,592
Changed for Other Than Turning	244
Net Wheels Changed for Turning	2,348

Average Labor and Material saved per pair turned—$55.00

TOTAL ANNUAL LABOR AND MATERIAL SAVINGS . . $129,140.00

MAJOR INVENTORY REDUCTION

(Actual reduction made at time of machine installation)

Wheel Assembly Type	Inventory Reduction	Value Each	Total Reduction
Roller Bearing with Clasp Brake	59	$ 856	$50,504
Roller Bearing with Budd Disc	35	1428	49,980
Roller Bearing with Spicer Drive	25	1783	44,575

TOTAL MAJOR INVENTORY REDUCTION $145,059*

*Inventory Reduction alone, is great enough to offset the cost of the machine. Therefore, all savings in Labor and Material are *pure* savings . . . savings in the cost of doing passenger business. A number of railroads are now enjoying savings like these. Our representatives can supply the facts behind studies of this nature. If you desire immediate information, write to: WHEEL TRUING, Standard Railway Equipment Manufacturing Company, 310 So. Michigan Ave., Chicago 4, Illinois.

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8 Roll Them Out Like New

Disassembling Equipment at the Backshop

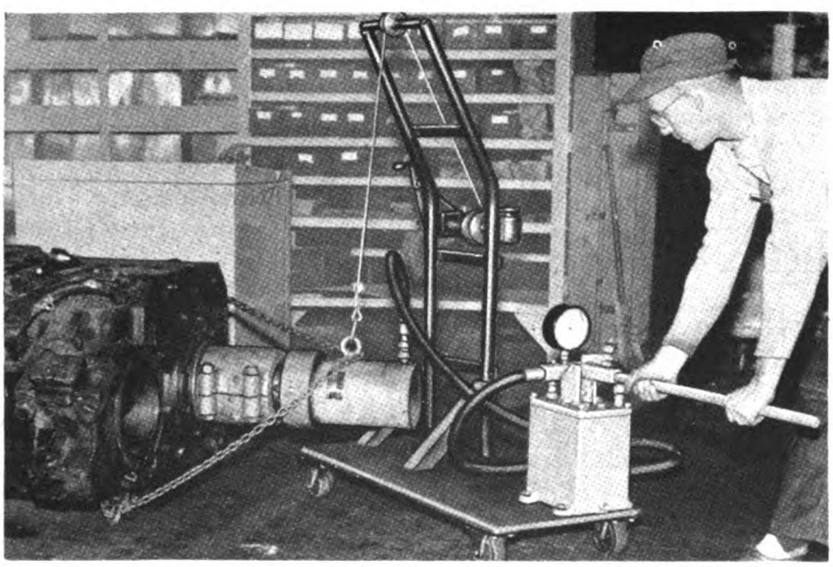

Fig. 1—Hydraulic pinion puller in use.

Fig. 2—Induction heater and wedges used for pulling pinio

THE NEXT STEP in backshop maintenance is to disassemble the machine and inspect the parts to determine their suitability for reuse. Like the hospital surgeon, the backshop expert must open up his patient carefully, so no harm is done in the operation. This requires the proper tools. Backshop "knowhow" is also essential so first things will be done first. You must know your machine as thoroughly as the surgeon knows the anatomy of the human body. Like him, you get this knowledge by study and practice. Refer to the manufacturer's instruction books, and study the cross-section drawings showing how the parts fit together.

Pulling the Pinion

Pulling the accurately fitted pinion from the tapered shaft of a traction motor is a job for powerful tools. Two widely used types are the hydraulic puller, and the induction heater puller. Each has its advantages and disadvantages. Local shop conditions and practice usually justify the particular choice. Either must be specifically adapted to fit the pinion correctly. Do not makeshift by attempting to use the same puller adaptor or heater coil on both freight and passenger pinions.

Some shops prefer the hydraulic type, such as the 150-ton puller shown in Fig. 1. With suitable split-ring adaptors to fit each size of pinion this type of puller gives satisfactory service. The pressure gage indicates the tonnage required to "pop" the pinion. This is a handy indication of the "fit" with which the pinion was applied, and serves as a check on the assembly practice used. If either too light or too heavy tonnage is indicated, the fact should be reported. Note that the safety chain should be taut, as shown, prior to removing the pinion. This takes up the reaction of the puller and prevents it from "taking off" when the pinion pops off the shaft. It also prevents the puller swinging out and striking back on the shaft with possible damage to the shaft fit or the thrust faces of the armature roller bearing.

The rule "keep tools in good condition" certainly applies to puller and adaptor parts. These highly loaded parts should be of good steel, and the register faces should be square and smooth. For best service, the ring surface which presses against the motor side of the pinion face should be as large as possible to distribute the pressure, and the ring should be as thick as can be easily assembled. All bolts should be drawn up tightly, and the threaded adaptor should be screwed up fully so all the threads share the load of 100-tons or more.

The induction heater puller, Fig. 2, is preferred by many shops. It is an electric induction coil designed to fit closely around the pinion teeth. When connected to a suitable a-c power supply, it induces large circulating currents in the metal of the pinion. These currents heat the pinion faster than the shaft, expanding the pinion and loosening its "fit" on the shaft. When just hot enough, the pinion can be "pulled" by driving steel wedges, as shown in Fig. 2. Resist the urge to hammer the wedges as if you were trying to "ring the bell" at the county fair. Use long, well-matched pairs of accurately machined wedges with ground faces. Beware of short, stubby single wedges usually found around a shop. This will avoid the type of damage shown in Fig. 3. Here the grease flinger has been bent and the bearing cap dented by using single

(*Continued on page 58*)

This is the eighth article in the series covering heavy maintenance of locomotive electrical equipment.

Part 8 is written by W. F. Davis, Locomotive and Car Equipment Department, General Electric Co., Erie, Pa.

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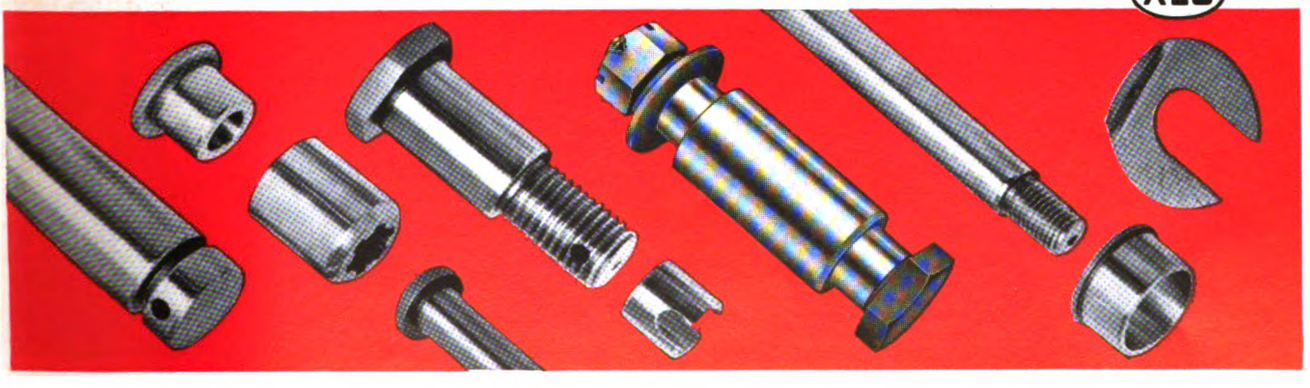

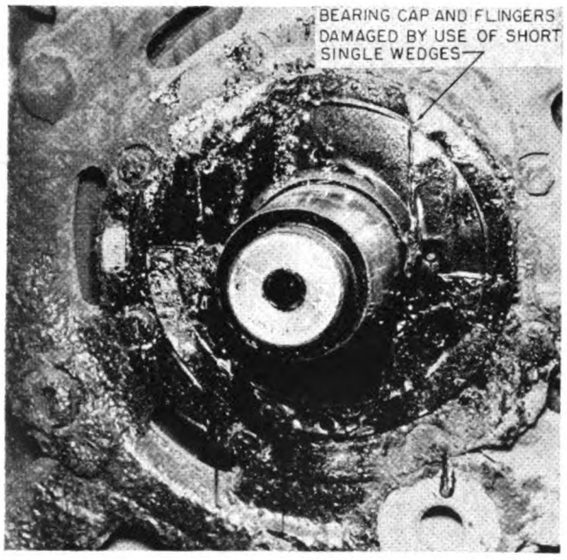

Fig. 3—Damage caused by improper wedging when pulling a pinion.

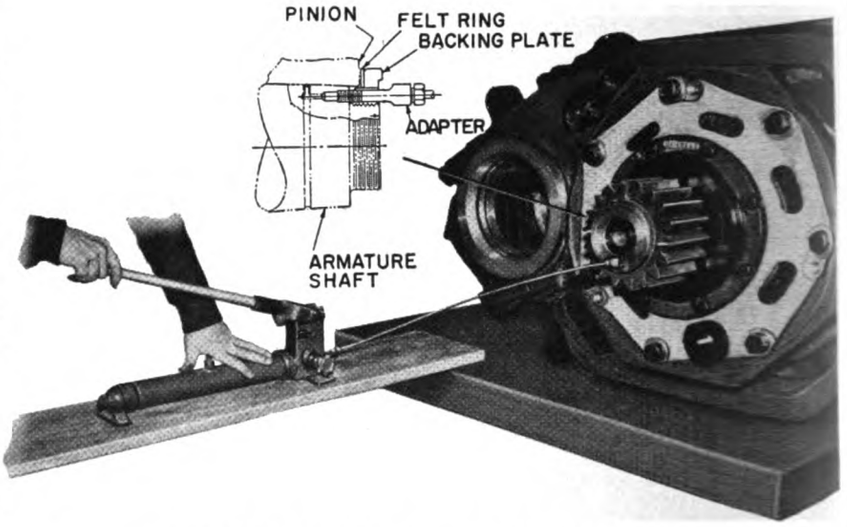

Fig. 4—Details of hydraulic float method of pinion removal.

wedges which bear on the outer tooth tip rather than close to the shaft. Also, do not use a sledge on the end of the shaft. This will damage the thrust faces of the roller bearings and mushroom the end of the shaft. Remember, pinion-pulling wedges are tools which must register against accurate machined surfaces on the pinion and shaft flinger. Even though the ends may be battered from hammering, the faces of these wedges should be kept straight and smooth. One more precaution—be careful not to exceed the prescribed heating time for each type of pinion. If the power is left on too long, there is danger of overheating the hardened steel surfaces of the pinion teeth. This will soften them and result in rapid wear if the pinion is returned to service.

There is another system of pinion removal that is quite new. It is the "float-off" system illustrated in Fig. 4. The armature shaft has a turned groove about the center of the tapered surface. A drilled hole connects this to a specially threaded fitting in the end of the shaft. A small, high-pressure pump is used to force oil through the hole and groove under the pinion fit. This expands the hub of the pinion, lubricates its inner bore and "pops" the pinion off the shaft. A safety nut with a felt ring next to the pinion is screwed on the end of the shaft. This prevents the pinion from "taking off" when it "pops" free. The equipment for this system is light and easy to use anywhere. Older motor shafts can be modified by a simple machining process.

Check the Lubrication and Bearings

Having removed the pinion, proceed to the bearings. The pinion and (PE) outer grease retaining flinger is first removed. If the flinger has threaded holes, studs can be inserted and a screw-type puller used. Examine the flinger to see if it has been bent through improper use of pinion pulling wedges. Next, carefully remove both bearing caps, (PE and CE) taking care not to disturb the grease. Observe the appearance of the grease in the caps and in and around the bearings; note its color, smell and consistency. Look particularly at the 6-o'clock position for presence of liquid oil bleeding from the reservoir of grease in the cap (Fig. 5) and entering the bearing. As long as the grease is semi-solid, holding its body without slumping down from its position in

(*Continued on page 60*)

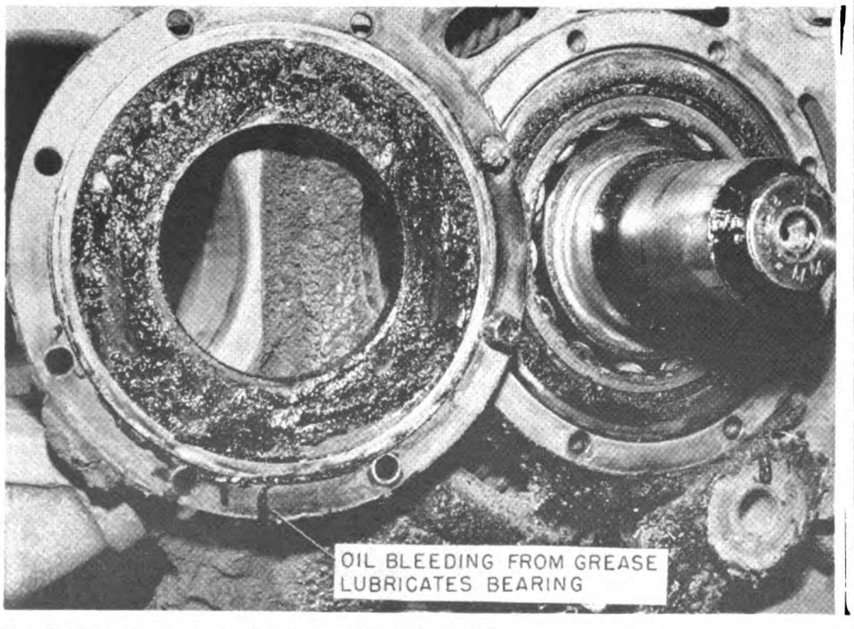

Fig. 5—Open bearing, showing grease in good condition.

Fig. 6—Use of dial indicator to measure bearing runout.

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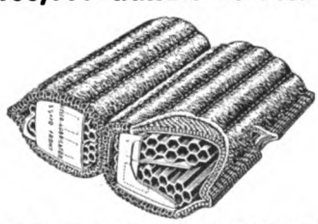

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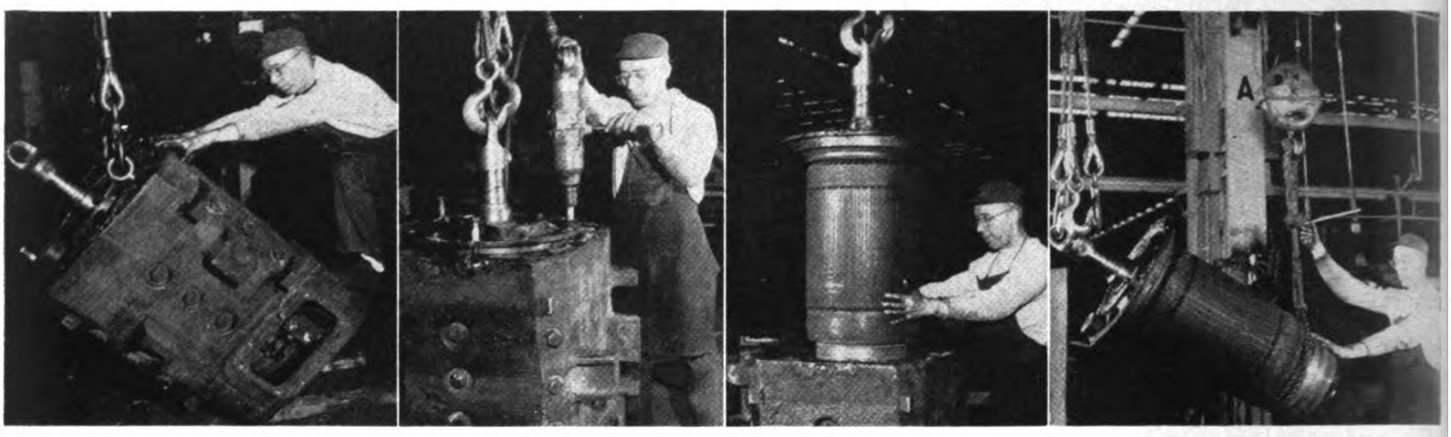

Fig. 8—Left to right—A, B, C, D—Sequence of pulling traction motor armature from frame.

Fig. 9—Use of screw-type puller to remove bearing from armature shaft.

the cap, and continuing to bleed oil to the bearing, it is in good condition. Also note the amount of grease in the cap; 60 per cent full is good. Record these observations on the check sheet.

Now is the time to check the roller bearing runouts, using a dial indicator. This is clamped to the shaft nut or bearing retaining bolt, as shown in Fig. 6, and rotates with the shaft as the armature is turned by hand. To avoid errors while taking indicator readings, keep the armature endplay all one way. It is easy to do this by blocking up the pinion end of the motor about four inches. Four indicator readings should be taken, on both ends: at 12, 3, 6, and 9 o'clock. For best results, the total indicator runout reading should not exceed 0.003 in. and should be even around the circle. Enter the readings on the check sheet. They will tell whether the frame and bearings and framehead are properly aligned. If runout is too great, parts should be checked further after disassembly.

The armature end play can easily be checked while the motor is still blocked up. With the dial indicator on either end of the shaft, the armature can be moved back and forth by prying with a small hand bar. Use a bar having about one square inch cross section and two or three feet long. It should be wedged squarely between the flat face of the steel

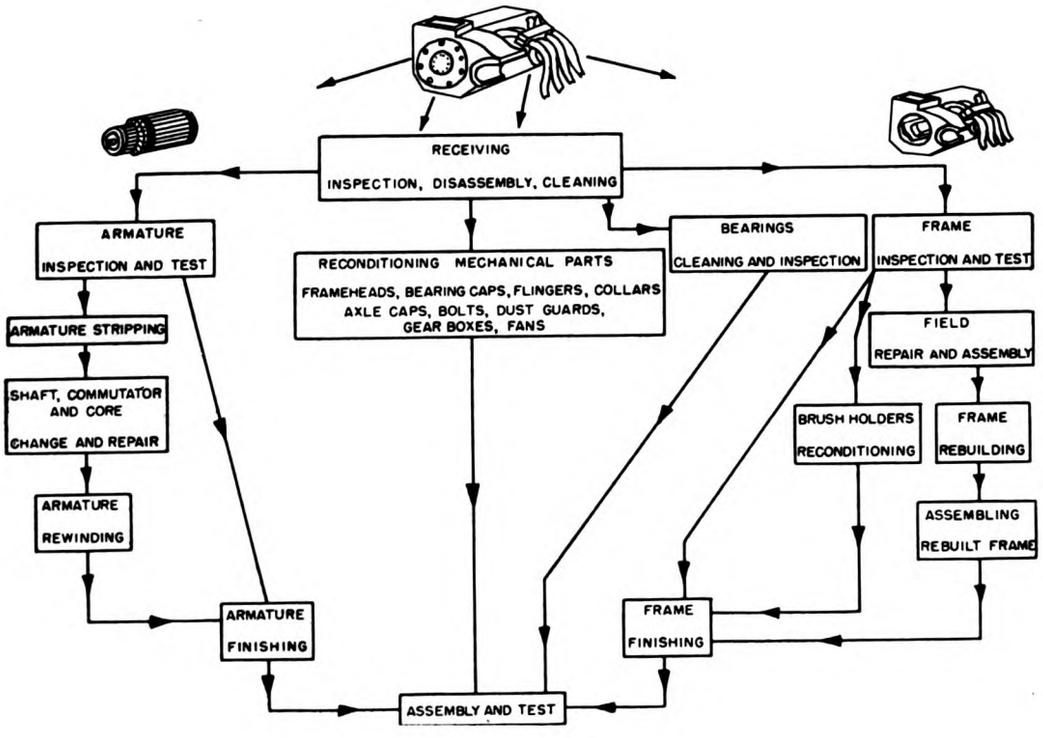

Fig. 7—Typical flow chart of back-shop work on motors and generators.

(*Continued on page 62*)

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commutator cap and the frame, using a small block of wood if necessary. While watching the indicator, move the armature back and forth two or three times. This will give you the "feel" as the armature reaches the limits of its end play. After you have this "feel," record the travel of the indicator as you move the armature. Guard against pulling more heavily on the bar than necessary to "chuck" the armature its approximate 0.10-in. end play. Also, take care not to pry against the copper of the commutator or any insulated parts of the motor. The end-play is actually built into the thrust roller bearing by the manufacturer. It varies slightly with different makes of bearings but will usually be less than 0.01 in. on a new bearing. If the reading is 0.015 in. or over, recheck to be sure there is no mistake before recording it on the check sheet.

Check the Axle Caps

The correct time to accurately measure the axle cap bores is before the frameheads and armature are removed and while the caps are bolted up tight. This can easily be done using inside micrometers. Take several diameters, marking them with indelible ink so that worn areas will be clearly marked and dimensioned. Check the rabbett fits; see if you can enter a feeler gage. Then take the caps off, noting whether they are easy or hard to remove. Good tight-fitting caps will require the persuasion of a husky, copper-headed maul or some sort of a jacking device to get them off. A hoist should be used to support the cap when it is released from its frame fit. Otherwise it will bang down on the floor, perhaps damaging itself and also endangering your toes. Measure the rabbett fit dimensions on both caps and on the frame. The difference is the interference fit in thousandths of an inch. Check manufacturer's instructions for the correct fit. If the fit is loose, and you have been able to enter a feeler gage when the cap was assembled, then look further for more trouble. The bore will probably be oversize and irregular. The job is then in need of heavy repairs including welding, milling and line-boring. All of this information should be entered on the check sheet.

Let's Take it Apart

At this point you are ready to start the serious disassembly of the machine for cleaning and distribution of the parts to their respective work areas. Although the routine will vary in different shops, it will generally follow the pattern of the flow chart shown in Fig. 7.

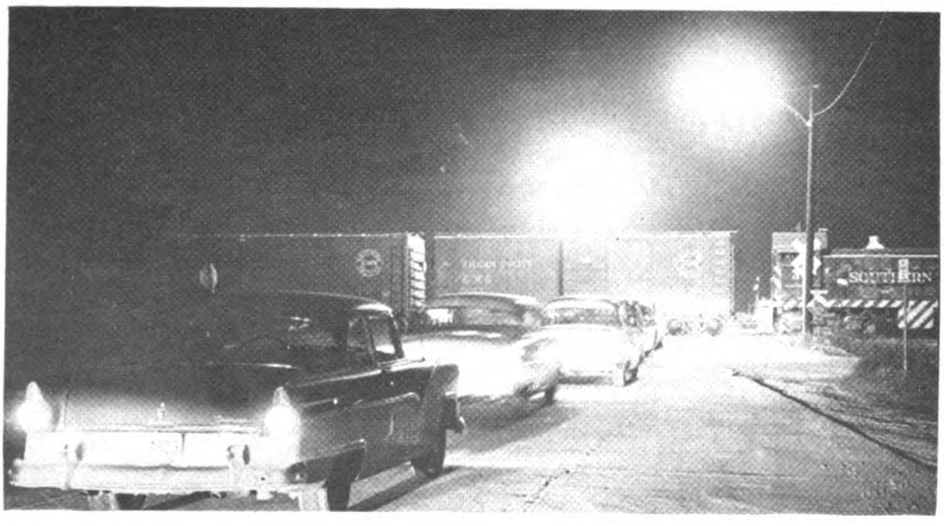
You will probably want to remove the armature vertically, so the motor will have to be upended. The method shown in Fig. 8 will work where special equipment is not available. While the motor is horizontal, remove the bearing cartridge bolts, if used, or the bearing locking nut or plate, from the end of the shaft.

Remove all of the PE framehead bolts. Screw a couple of lifting eyes into two of the framehead bolt holes. Be sure the CE bearing cap bolts are all removed, also the flange ring which normally bears against the ends of the rollers. In other words, remember how the parts fit together and be sure that the CE bearing assembly is ready to come apart before upending the motor. Lifting with twin crane hooks the motor is easily upended and rolled over on a couple of 2 X 4's laid flat on the floor; Fig. 8A.

With the motor in a vertical position, the weight of the armature should be taken up by the crane, Fig. 8B, while the PE framehead is being "jacked" from its tight fit with the frame. It is necessary to coordinate the lifting (inching) of the armature by the crane with the slower but even jacking of the framehead. Otherwise the crane will tend to lift the whole motor through the framehead fit, with possible dropping of the frame when the fit is released. It is important that the framehead be jacked evenly so as not to cramp it in its fit during removal. This can be done by following a progressive pattern of take-up. Take a few turns at a time on each bolt, always moving around the circle of bolts in the same direction. When the framehead is free, the armature should be carefully lifted from the frame as shown in Fig. 8C. It should then be lowered to a horizontal position with the aid of an auxiliary hoist, as shown in Fig. 8D.

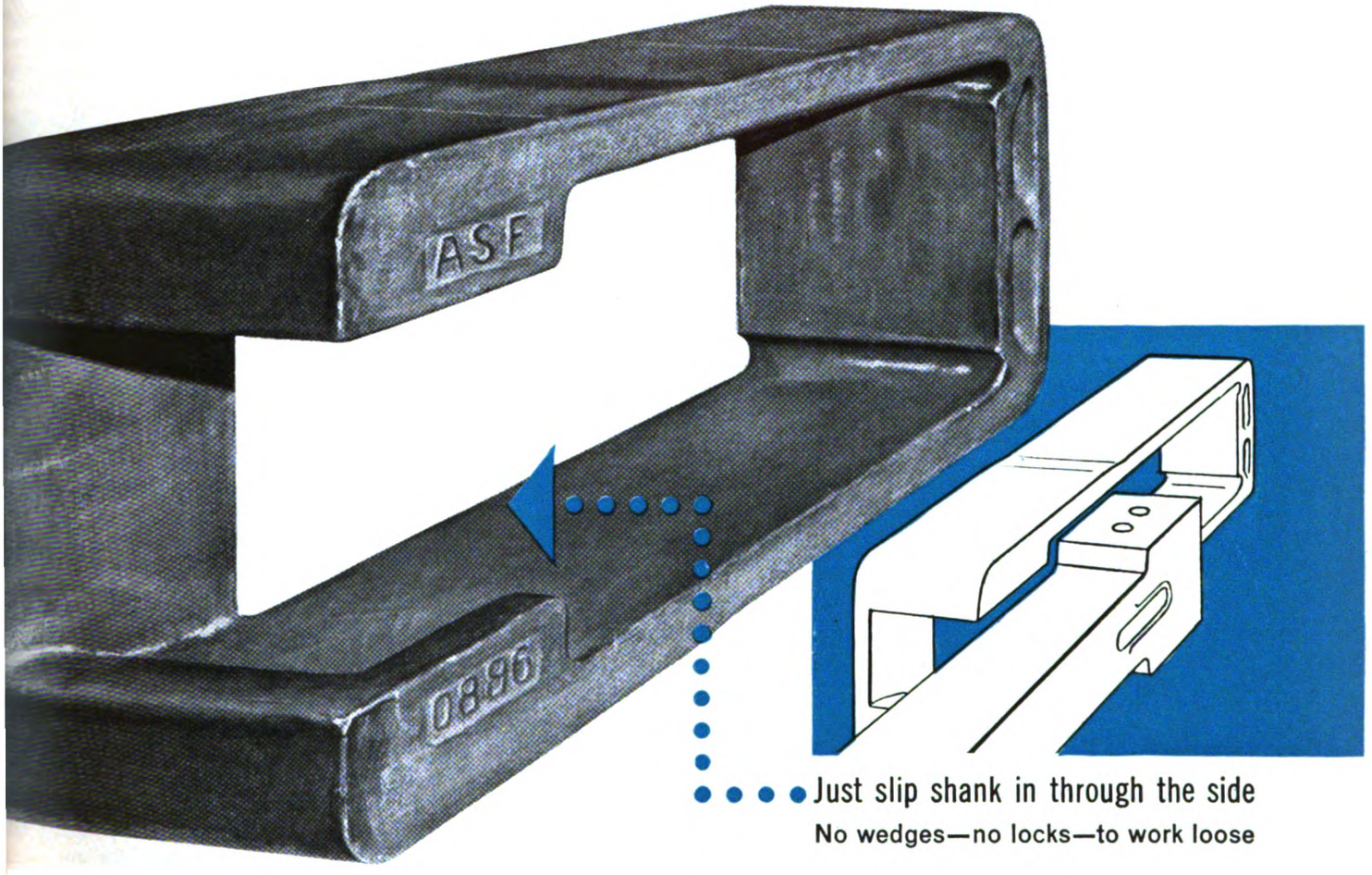
For removing armature bearings and collars, a screw type puller, Fig. 9 is good. In general, all tight-fitting parts like flingers, collars, sleeves, and bearing races can be removed with a puller of this type, using suitable adaptors. The heavy plate is usually provided with a crows-foot pattern of radial slots to suit 2, 3 or 4-bolt patterns of different diameters. Heat must be used in some cases where small diameter collars are not provided with clearance behind for puller fingers to engage. An acetylene torch can be used for this, but it should be handled by an expert who knows how to play the flame around the circle and just how long to hold it on the part to be removed. The "feel" for this is acquired through experience. Quick action with a pry bar while the part is hot is required to free it.

Removal of outer roller bearing races from frameheads and bearing housings is easily and quickly done in a suitable arbor press. A round fixture made of fairly heavy plate should be used. It should have a turned register face suitable for pressing squarely on the face of the outer race without allowing pressure to bear on the rollers or roller cage.



This railroad grade crossing which cuts across a heavily traveled Buffalo Speedway in Houston, Texas, is the site of a new experimental lighting system. Designed to reduce the inherent hazard posed by grade crossings, the system consists of two General Electric Form #406S fluorescent luminaires, mounted diagonally at the rail-artery-railroad intersection. The approach side of the luminaire globes has been painted with yellow acrylic paint to indicate a danger area.

NOW... an ASF ne-piece keyless yoke*



Just slip shank in through the side

No wedges—no locks—to work loose

- A rugged, one-piece steel casting with a high margin of safety—fully meeting AAR strength standards.
- Now AAR Approved
  24⅝" pockets—AAR Certificate No. B95
  18½" pockets—AAR Certificate No. B96
- Simple in design—no wedges or locks, no parts to work loose.
- Quick, easy installation—just slip the coupler shank through side opening. No complicated assembly problem of forcing shank back far enough to insert wedge.

ASF

For the most practical replacement of riveted-type yokes . . . specify the

ONE-PIECE CAST STEEL YOKE

AMERICAN STEEL FOUNDRIES

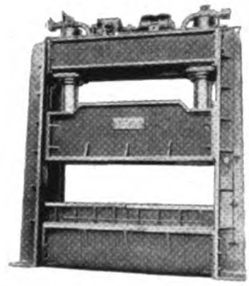
Prudential Plaza, Chicago 1, Illinois

Canadian Sales: International Equipment Co., Ltd., Montreal 1, Quebec

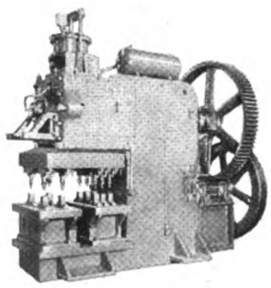
Other Foreign Sales: American Steel Foundries, International, S. A., Chicago

Patent Pending

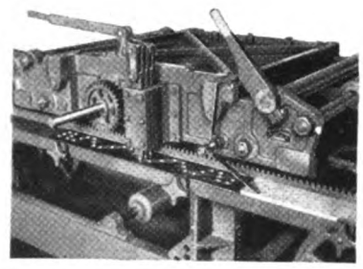
BEATTY
Metal-Working Equipment



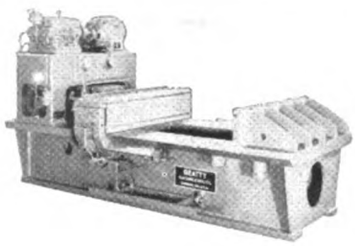
VERTICAL BULLDOZER



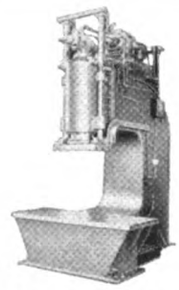
HEAVY DUTY PUNCH



SPACING TABLE



HORIZONTAL BULLDOZER



GAP TYPE PRESS

Here Are 5 Ways To Lower Costs

Five Beatty machines, each engineered to save time and manpower—increase production on heavy metal-working jobs: punching, forming, bending, flanging. Beatty machines are built for simplified operation—reduce stock handling and set-up changes. They're built rugged, too, for day-in-day-out operation with a minimum of down time and maintenance. Write today for detailed information on a Beatty installation to fit your needs. Job-engineered Beatty equipment helps reduce your costs.

VERTICAL BULLDOZER for hot and cold pressing and forming of heavy metal.

HEAVY DUTY PUNCH handles 65 ft. stock. Punches webs and flanges.

SPACING TABLE handles beams, channels and plates with speed and precision.

HORIZONTAL BULLDOZER is a compact unit for heavy forming, flanging and bending.

GAP TYPE PRESS is hydraulic, 250 ton cap. for forming, bending, flanging.

BEATTY MACHINE & MFG. CO.
962 150th St., Hammond, Ind.

The Engine Ran Without Fuel

(*Continued from page 54*)

engine continued to run. Then one o the maintainers proposed the fuel pip be disconnected from the fuel pump This was done and, with the fuel supply line severed from the fuel supply tank the engine kept on running. The maintainers could not believe their eyes. They either had the most wonderful engine in the world or they had overlooked something.

Since the engine could only be started with the aid of the fuel pump, and since the shutter control could only be energized from the fuel pump circuit, all pipe connections were restored and the fuel pump placed in service. The unit was returned to service working satisfactorily.

Still in doubt as to what had happened, the maintainer who had first taken over the job wrote to a friend at the system diesel house where he thought they might have had a similar case. It was explained this way in the reply he received.

There had been a number of cases of this kind. They had occurred on EMD Alco and Baldwin units. In all cases it was found that the engine secured its continuing fuel supply (after the fuel pump was shut off), by the fuel injectors siphoning the fuel from the fuel supply tank beneath the car body. The injectors drew the fuel supply from the fuel return line, whose normal duty it was to return the excess fuel not needed by injectors, to the fuel supply tank. In this case, the fuel return line extended into the fuel tank terminating near the bottom of the tank. In other words, the fuel return line was immersed in fuel when the fuel pump was shut down.

The regular and proper plan of piping the fuel return line is to have it terminate near the top of fuel tank above the fuel level. When piped properly the fuel return line will not act as a fuel supply line in the event the fuel pump is shut down.

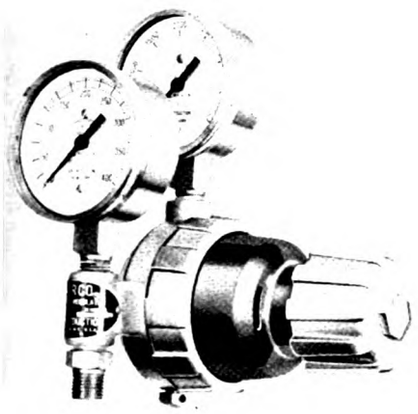
In a case of this kind, it is first necessary to have the fuel pump running to cause the fuel return line to be full, give the injectors an opportunity to siphon the fuel supply from that source the instant the fuel pump is shut down.

A variation of this case occurred on an FP unit equipped with a steam generator. An interconnection of piping for the fuel supply for the steam generator and the fuel supply to the engine permitted the fuel injectors to siphon fuel supply for the engine from the fuel line to the steam generator. A rearrangement of the piping solved that case.

'hat's New

(Continued from page 8)

tire AWG range of 8 to 4/0. Multi-faced mping dies are permanently mounted thin the head of the tool. The operator ects the proper dies, to match the size minal being installed, by loosening locator ıs and rotating the dies to the desired cor- :t position. The variety of wire sizes accom- ɔdated eliminates the need for several mping tools. *American Pamcor, Inc., Dept. .C, 181 Hillcrest ave., Havertown, Pa.*



ıgle-Stage gulators

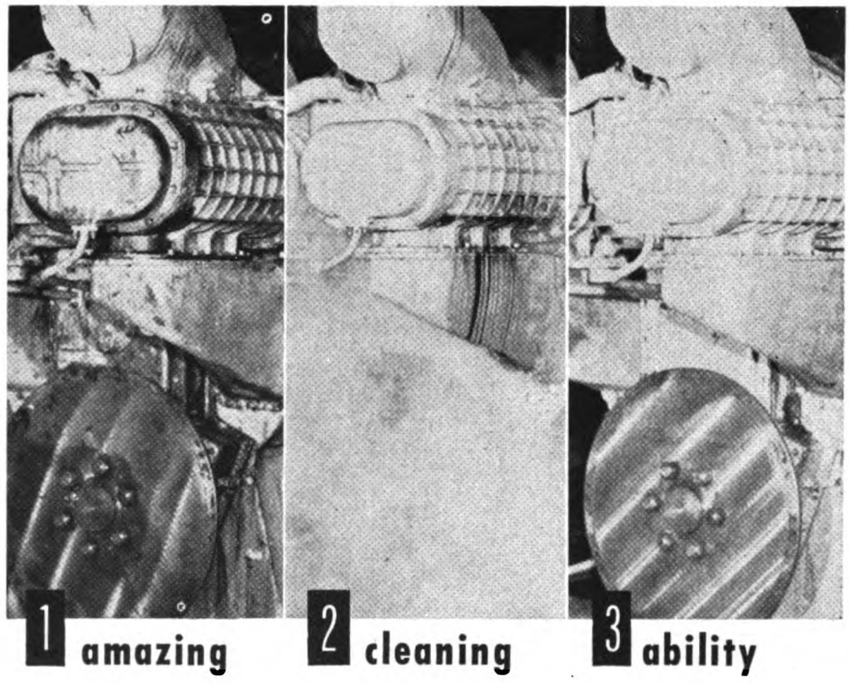
se single-stage inverse-type regulators, for gen, acetylene, hydrogen, nitrogen, argon, um or carbon dioxide, provide a sub- ıtially higher delivery rate and maintain ıore cons:ant delivery pressure. There is drop-off in working pressure as cylinder sure decreases, and the gas is more com- ely exhausted from the cylinder.

/ithout tools, the spring case and low- sure cavity can be opened and the dia- ıgm removed. The sure-grip brass ad- ing knob is a change from the usual T-bar , and a hexagonal nut projects from the b end to permit the use of a six-way ıch. *Air Reduction Sales Company, a di- ɔn of Air Reduction Company, Dept. ., 150 East 42nd st., New York 17.*

·ought Iron

improved 4-D wrought iron is produced substantially increasing the deoxidization ıe base metal; increasing the phosphorus ent in relation to the other material com- :nts and using a more siliceous silicate ous material. Approximately 250,000 of : silicate fibers are evenly distributed ıghout each cross-sectional square inch ıe metal.

:sts have shown that 4-D wrought iron greater uniformity, improved physical mechanical properties, and superior re- ıce against many kinds of corrosive :s, including those caused by severe strial atmospheres, acid solutions, salt r, and steam condensates. *A. M. Byers :pany, Dept. RLC, Clark building, Pitts- h 22.*



LIX DIESEL KLEAN HEAVY

cleans dirty diesels

FASTER and at LOWER COST!

No wonder so many leading railroads like LIX over other cleaners! Lix reduces cleaning time to a *minimum* . . . cuts costs 'way down. No scraping or brushing is necessary . . . Lix soaks away all grit, grime and caked carbon—cleans even the dirtiest diesel parts brighter than new. In tank-cleaning of parts, it is harmless to all metals during cleaning cycle . . . and all metals can be cleaned in same tank. It leaves no granular deposits . . . reduces after-rusting. Lix is safer, too—is of low toxicity, is not a fire hazard. And because of its *longer life* without frequent charges, Lix is more economical in the end than "less expensive" cleaners!

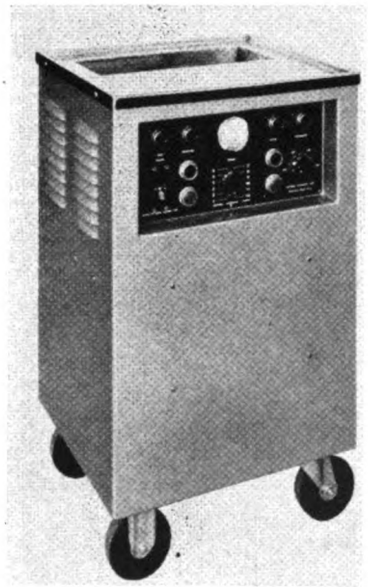
It's easy to *prove to yourself* how you can cut the cost of periodic surface cleaning of locomotives and of overall cleaning of diesel parts—just write, wire or phone for a no-cost, no-obligation DEMONSTRATION of Lix Diesel Klean Heavy in your own shop!

Manufacturers of Lix Diesel Klean Heavy and Lix Electric Equipment Cleaner

THE Lix CORPORATION
PRODUCTS OF RESEARCH
(OF MISSOURI)
300 WEST 80TH, DEPT. RL4
KANSAS CITY, MISSOURI

"Leadership in Industrial Cleaning"

(Continued from page 65)



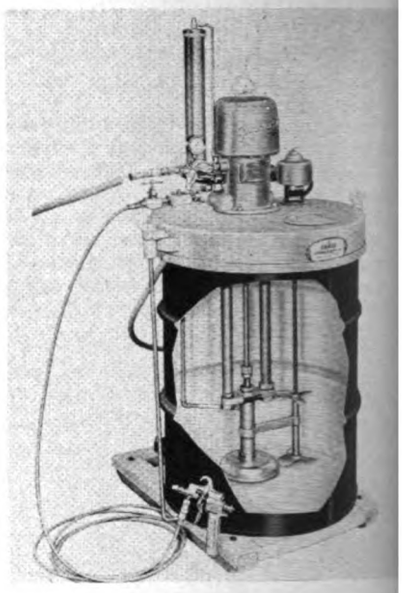
Ultrasonic Cleaning Unit

This Model R-50 self-contained ultrasonic cleaning set-up in a single cabinet includes a heater, temperature control, filtration and recirculation system in addition to the ultrasonic generating equipment. It is small enough to be moved easily. Overall dimensions are 22 x 19 x 37 in. high. Piping, pump and filter are of stainless steel, with Teflon gaskets, making the unit suitable for alkaline solutions, solvents, and mild acids.

The tank, itself, is 6 x 16 x 11 in. deep, with a total working volume of 5 gal. The transducers mounted to the bottom have a rate input of 250 r-f watt average (1 kw peak), which convert into mechanical vibration at 38 kc. This high-speed agitation causes caviation in the liquid, providing a gentle but thorough scrubbing action. Even insoluble soils may be removed in minutes—sometimes seconds—and little operator attention is necessary. *Branson Ultrasonic Corporation, Dept. RLC, 40 Brown House Road, Stamford, Conn.*

Waterless Cleaner

Stratogel eliminates the need to stock different liquid or powder compound cleaners and the use of water. It is a concentrated paste-cream which is applied quickly and easily with a damp cloth or sponge. It removes oil, grease, scum and other soils from unpainted and painted metal surfaces, and from glass, plastic, and fiber glass. Dirty engines, toilet fixtures, instruments, venetian blinds and cushions all respond to this waterless cleaner which comes in 1-lb jars, 4-lb pails, and 40-lb drums. *Fine Organics, Inc., Dept. RLC, 211 East 19th st., New York 3.*



Paint Spray

The Hydra-Spray eliminates the need for atomizing air, heat, or excess solvents in spray painting. A combination of high fluid pressure and a small fluid nozzle creates the material break-up without atomizing air. This is said to reduce overspray, bounce-back and hazardous fumes to a minimum.

The process uses a specially engineered air-powered pump that produces fluid pressure twenty times that of the inbound air pressure. Being air powered, the pump exerts no pressure in the container, eliminates electrical connections, and operates only while actually spraying. *Gray Company, Dept. RLC, 1020 Sibley st., N.E., Minneapolis 13.*

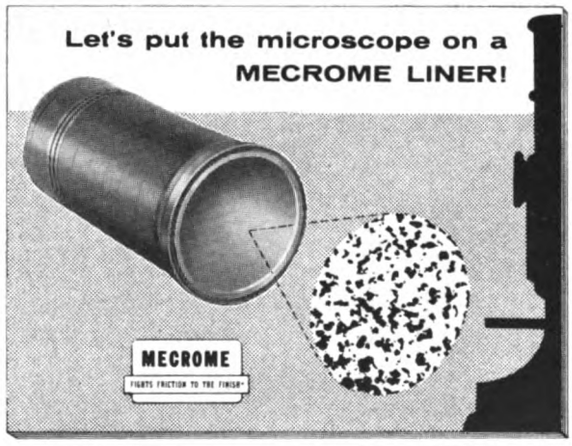
Blind Fasteners

The Jack nut is a blind fastener with threads which grip any material from 0 to ⅜ in. thick. It is self-adjusting to grip evenly on flat and curved, as well as smooth and irregular surfaces. Jack nuts can be used as rivets or blind fasteners in expansion spaces as small as ⅜ in. They provide firm nutplates for attachment screws, and the anchorage is permanent, permitting screws to be removed and replaced.

Jack nuts allow holes to be fashioned

(Continued on page 68)

"MUST READING" for every Diesel Engine user!



MECROME LINER BOOKLET...

Want to know how to increase liner life . . . reduce premature cylinder change-outs . . . increase ring life? It's all in this well-illustrated booklet that's "must reading" for you! This informative folder shows how we provide liners with stable chromium plated bearing surfaces with Mecrome controlled porosity that materially increase cylinder life. Mail the coupon for your complimentary copy.

METAL FINISHERS, INC.
1725 East 27th Street, Cleveland 14, Ohio
Please send without obligation a copy of your liner booklet.

Name _____
Company _____
Address _____
City _____ Zone ____ State _____

MECROME
FIGHTS FRICTION TO THE FINISH

METAL FINISHERS, INC.
1725 E. 27th ST. • CLEVELAND 14, OHIO • TEL.: MAin 1-0511
3125 BRINKERHOFF ROAD • KANSAS CITY, KANSAS
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INSIDE STORY of the new attack on the HOT BOX PROBLEM

AAR APPROVED
for limited application
in interchange service

CLEVITE Sealed Sleeve Bearing Cartridge

...new, permanent, soundly engineered and economical journal bearing conversion for freight cars

Field Reports:

In continuing road and laboratory tests, under extremes of actual and simulated operating conditions, Clevite Cartridges are exceeding all performance expectations.

Careful shop checks show that Clevite Cartridges require less modification, are installed at lower cost than any other permanent conversion.

Keep your eye on CLEVITE!

DISTRIBUTED BY:

STANDARD CAR TRUCK COMPANY

332 S. Michigan Ave., Chicago 4, Illinois. *In Canada:* Consolidated Equipment Co., Ltd., Montreal 2, Quebec

The CLEVITE Bearing Cartridge is a development of Cleveland Graphite Bronze Co. division of Clevite Corporation, Cleveland 10, Ohio

(Continued from page 66)

fore, during, or after fabrication. They do not require special holes and hole size is not critical. They are available in two lengths short for thicknesses from 0 to 3/16 in. and long for 0 to 3/8 in. They are installed with a screwdriver and any U.S. standard 6-32, 10-24, or 1/4-in.-20 screw. *Molly Corporation, Dept. RLC, Reading, Pa.*

Torque Converter Trackmobile

The improved torque converter Trackmobile is equipped with an all-new power train which includes a new engine and a torque converter-hydraulic transmission combination.

The six-cylinder engine enables the unit to develop 13,000 lb of drawbar pull. The torque converter and hydraulic transmission eliminate clutch manipulation and conventional gear shifting; enable operators to have more exact control of the Trackmobile movement at all times; multiply engine torque to fit load requirements, and provide an oil cushion to protect the Trackmobile from the effects of shock loading. *Whiting Corporation, Dept. RLC, Harvey, Ill.*

Cable Fault Locater

The ARI Thumper cable fault locater is a device to convert the high voltage, low current output of a d-c high potential tester into a high voltage, high current impulse supply for locating faults in electrical power cables.

It consists of a high-capacitance, high voltage capacitor, an adjustable sphere gap, necessary current limiting resistors and terminations for connecting the unit between the Hypot and the cable under test. Breakdown voltage may be varied to suit the fault in the cable. By proper adjustment of the gap spacing and the voltage setting of the Hypot the test potential and repetition rate of the pulse voltage may be varied to suit conditions.

In operation the capacitor charges until the voltage is sufficient to flash across the sphere

(Continued on page 70)

...Kershaw Leadership Enters the MECHANICAL FIELD!

The Kershaw Inspector's Cart enables car inspectors to carry a sufficient supply of car oil and packing to allow complete servicing of every journal box. In this way, he can completely service a much greater number of cars.

With the Kershaw Inspector's Cart, the inspector can carry a journal jack, basic hand tools, and a supply of brass, brake shoes and brake hose. This eliminates lost time in going back to the storehouse for parts. It also lessens the temptation of passing up necessary maintenance, and the necessity of routing cars to the rip track for minor repairs.

The Kershaw Inspector's Cart may be equipped with racks to hold oxygen and acetylene tanks, and a torch for repairing grab irons, steps and safety defects. It may be equipped with as many as five floodlights to completely illuminate work area for night operation.

The Kershaw Inspector's Cart will travel between box cars in yard areas. Side runners guide the cart between tie ends so the operator can devote full attention to inspection and maintenance. The Kershaw Inspector's Cart travels in either direction with equal ease at speeds up to 12 mph.

Now ...
more than ever ...
Recognize This Symbol of Leadership ...

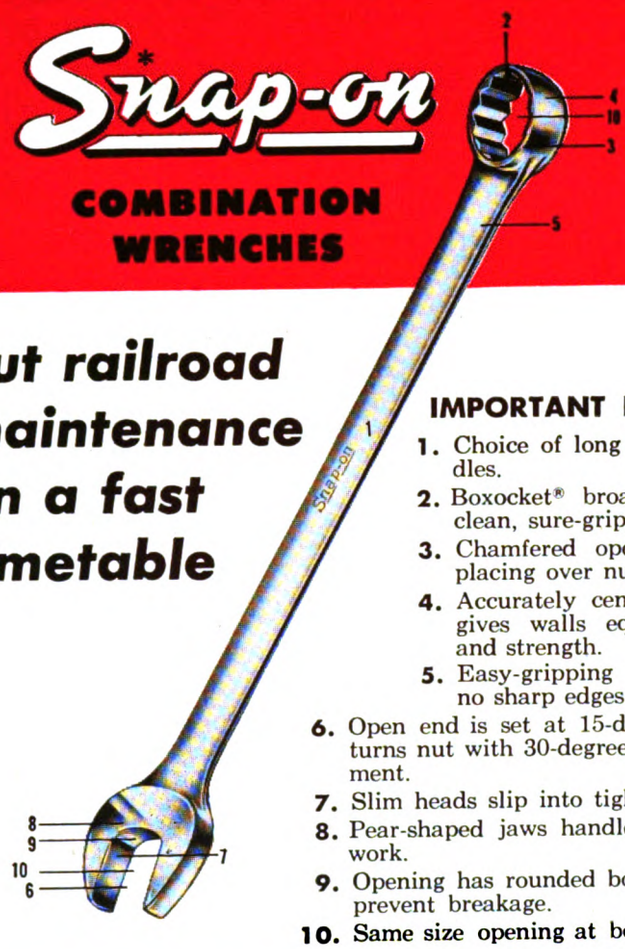
KERSHAW
MANUFACTURING CO. INC

MONTGOMERY ALABAMA

Snap-on

COMBINATION WRENCHES

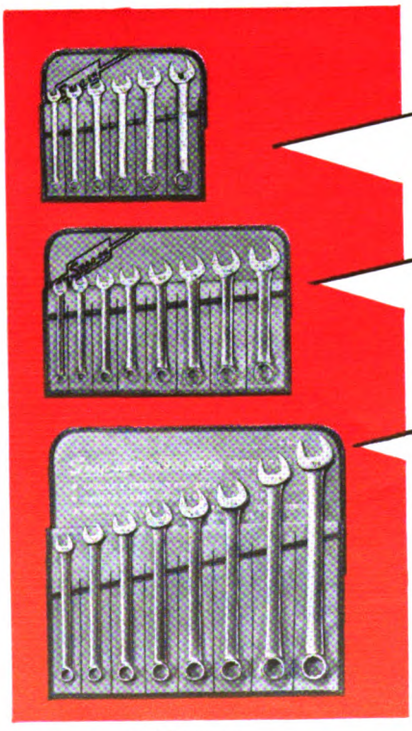
Put railroad maintenance on a fast timetable



IMPORTANT FEATURES

1. Choice of long or short handles.
2. Boxocket® broached to give clean, sure-gripping walls.
3. Chamfered opening aids in placing over nut.
4. Accurately centered opening gives walls equal thickness and strength.
5. Easy-gripping handles have no sharp edges.
6. Open end is set at 15-degree angle — turns nut with 30-degree handle movement.
7. Slim heads slip into tight spots.
8. Pear-shaped jaws handle close-quarter work.
9. Opening has rounded bottom — helps prevent breakage.
10. Same size opening at both ends.

3 POPULAR SETS
OTHER SETS AND EXTRA-LARGE SINGLE WRENCHES AVAILABLE



Angled-clearance offset — 6-wrench set from 5/16 to 5/8-in. openings. Also individually.

Close-quarter short handle— handy 8-wrench set from 5/16 to 3/4-in. openings. Also individually.

High-leverage long handle — 8-wrench set — sizes from 7/16 to 7/8-in. openings. Also 12, 15 and 18-wrench sets. Also individually.

Your Snap-on railroad specialist is trained and experienced to aid in the selection, use and care of tools needed on your line. Give him a call.

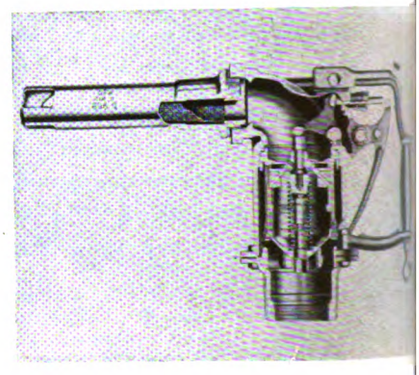
SNAP-ON TOOLS CORPORATION
Railroad Division
8130-D 28th Avenue • Kenosha, Wisconsin

What's New

(Continued from page 68)

gap. The other side of the gap is connected to the conductor of the cable. The steep wave front pulse travels along the cable until it reaches a fault. With a high enough potential, the steep wave pulse (commonly called the tracer signal) discharges across the fault to ground and returns to the tester. The exact location of the fault may then be determined in many cases by moving along the cable and listening for the point at which the tracer signal breaks across the fault. In case of a dead short or where other conditions limit noise, a pickup coil with suitable indicating devices or ear phones may be used.

The Thumper cable fault locater is rated 2½ kv, d-c at approximately 315 watt-seconds. It is completely enclosed in a metal box with a transparent lucite cover. The sphere gap is adjustable from outside the box, and its adjustment is calibrated to give an approximation of the voltage setting and may be adjusted while the unit is in operation. This instrument is approximately 15 in. x 15 in. x 15 in. and weighs about 90 lb. *Associated Research, Inc., Dept. RLC, 3777, W. Belmont Ave., Chicago 18.*



Fueling Nozzle

The OPW-Jordan 620 fueling nozzle features high flow capacity and shockless closure. It will deliver 220 gal. per minute at 50 psi. The adjustable slow-closing mechanism prevents line shock, even on pressures up to 100 psi. It is available in 2-in., 2½-in. and 3-in. sizes. The high-tensile aluminum alloy body has bronze trim, with composition seats for tight shut-off. *Sales Division of OPW Corporation, Dept. RLC, 6013 Wiehe Rd., Cincinnati 13.*

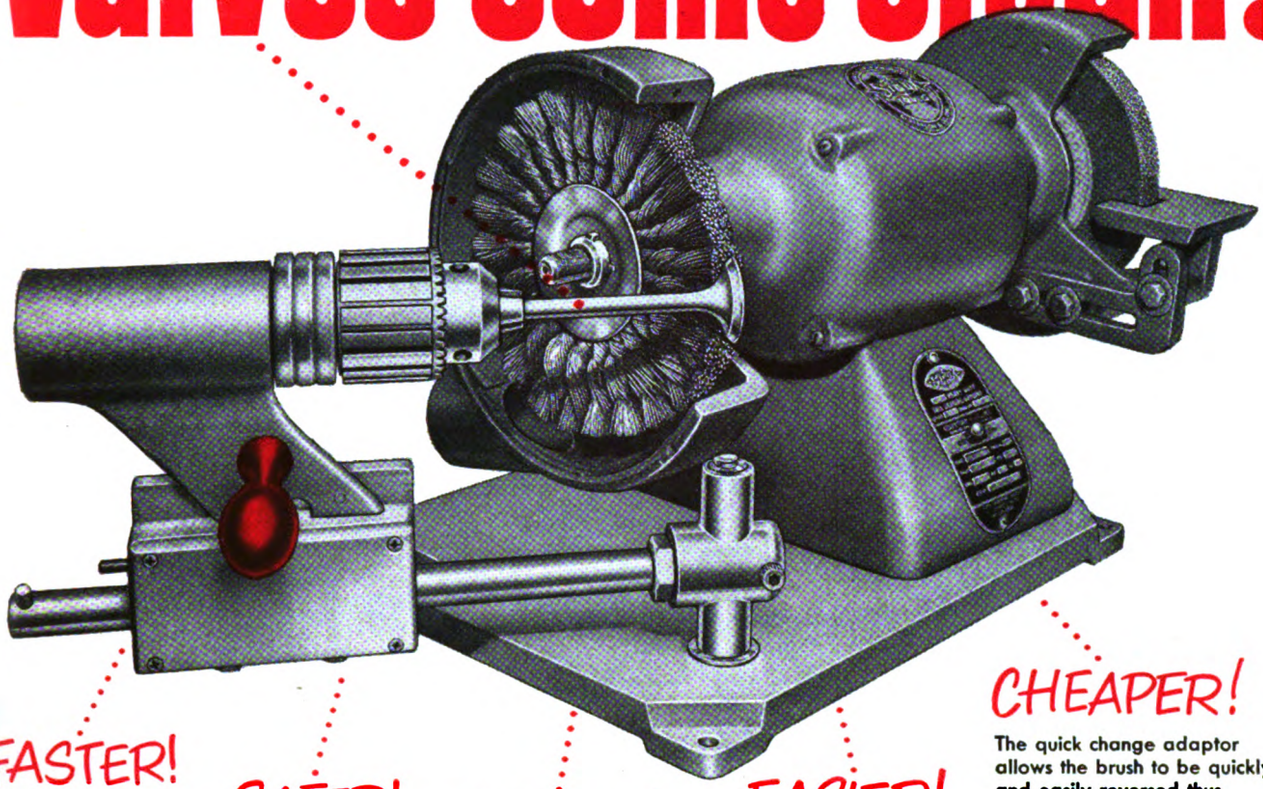
Epoxy Resins for Motor Re-insulation

A low-cost method for reinsulating traction armatures which has been tried out over a period of two years on western railroads is now available for general application.

Insulation shrinkage during aging of insulation permits chafing and allows for

(Continued on page 72)

Valves come clean!



FASTER!
Valves can be cleaned in 15 seconds.

SAFER!
Chuck holds valve; fingers are never near wire brush.

BETTER!
Hardest carbon deposits disappear, leaving a clean, shiny surface.

EASIER!
Takes the drudgery out of valve cleaning. The machine does the work. No skill required.

CHEAPER!
The quick change adaptor allows the brush to be quickly and easily reversed thus bringing sharp cutting points into play. Dull brushes stop cutting. Frequent reversing triples the life of the brush.

WITH THE NEW SIOUX

REVERSING KEEPS SHARP EDGES AT WORK

QUICK CHANGE ADAPTOR

VALVE CLEANER ATTACHMENT

The SIOUX Valve Cleaner can be supplied with bench grinder as shown or sold as an attachment to fit an existing 6″, 7″, or 8″ bench grinder. It's another entirely new product exclusively from SIOUX to you.

SIOUX

ALBERTSON & CO., INC.
SIOUX CITY, IOWA, U.S.A.

LOOK UNDER "TOOLS—ELECTRIC"

NEW AIR IMPACT WRENCHES • NEW AIR SCREWDRIVERS • NEW "PELICAN" NUT ACCUMULATORS • ELECTRIC IMPACT WRENCHES • DRILLS • GRINDERS • SANDERS • POLISHERS • SCREWDRIVERS • PORTABLE SAWS • VALVE FACE GRINDING MACHINES • FLEXIBLE SHAFTS • ABRASIVE DISCS

FREE

NEW SERIES

HOW-TO-DO-IT ARTICLES

on Commutator and Slip Ring Maintenance

Years of experience are packed into this new 6-article series — each an invaluable guide for keeping commutators and slip rings at peak performance.

Each article discusses a major part of the overall problem — gives practical tips on maintenance — tells how to solve common problems — what to do and how to do it — in easily read shop language. Supplied in attractive folder, forming complete maintenance data file.

Designed as useful refresher reading and trouble shooting guidance for the veteran maintenance man . . . and a must for the new man just "breaking in" . . . the entire series has been prepared in close consultation with leading, nation-wide engineering authorities.

Mail the coupon for Article No. 1 now. Don't miss it — the remainder of the series will be sent to you at regular intervals, free and without obligation.

IDEAL Preventive Maintenance
Everything in equipment and methods for Commutator and Slip Ring Maintenance.

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1563-D Park Avenue, Sycamore, Illinois
Please send free folder and article No. 1 of series "Commutator and Slip Ring Maintenance."
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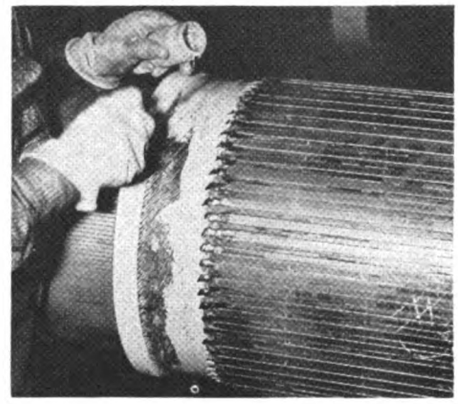
City_____ Zone____ State_____

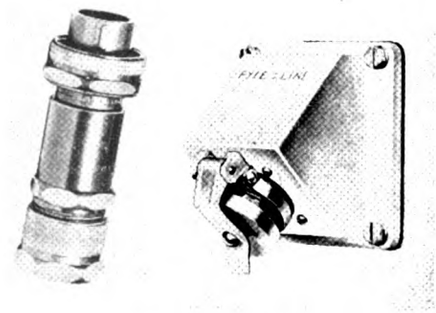
What's New

(Continued from page 70)



age caused by vibration. The new method of reclamation is said to eliminate rewinds by satisfactorily reinsulating traction coils in place on the armature.

The insulation material, which is applied by spatula, cures hard in a half-hour at room temperature. It is claimed to provide a dielectric strength of 500 volts per mil and to bond tightly to old insulation and adjacent metal. *Epoxylite Corporation, Dept. RLC, 10829 E. Central ave., El Monte, Calif.*



Plug and Receptacle

These plugs and receptacles, designed for severe industrial use, are identified as Pyle-Star-Line Circuit Breaking Series "C" Connectors. They are available in cable connector, panelboard, bulkhead and conduit fitting types and are for interrupting circuits in N.E.C. ampere ratings of 30, 60, 100, and 200 amp, 600 volts, a-c. All types have a double lead plug coupling thread for quick connect and disconnect action. Threaded housings can be furnished with dust cap or a hinged spring flap cover.

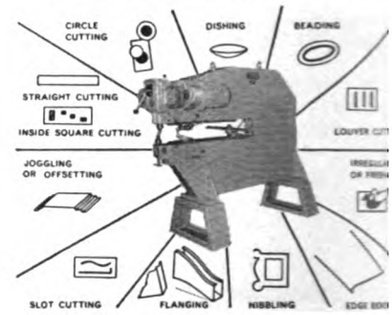
Interchangeability of components permits many assembly combinations, including a wide choice of contact configuration inserts ranging from 4 to 100 poles for power, control, and electronic circuits.

Circuit braking types are furnished with solder well or pressure type (solderless) wire terminals. Taper well or crimp type contacts are available with other contact inserts. *Pyle-National Company, Dept. RLC, 134 N. Kostner ave., Chicago 51.*

A COMPLETE SHEET MET
SHOP IN ONE MACHINE

PULLMAX

DOES ALL OF THESE OPERATIO



★ CUTS MILD STEEL UP TO 11/

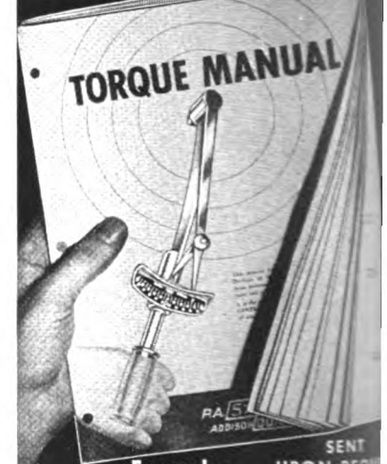
The one machine that's sure t save time, labor and materia when you work sheet or plate Eliminates expensive die costs- easy to operate. 7 sizes to choos from.

Write for free catalog on Metalworking Ideas.

. . . or a demonstration right in your plant.

AMERICAN PULLMAX CO., IN
947 W. Altgeld St., Chicago 14,

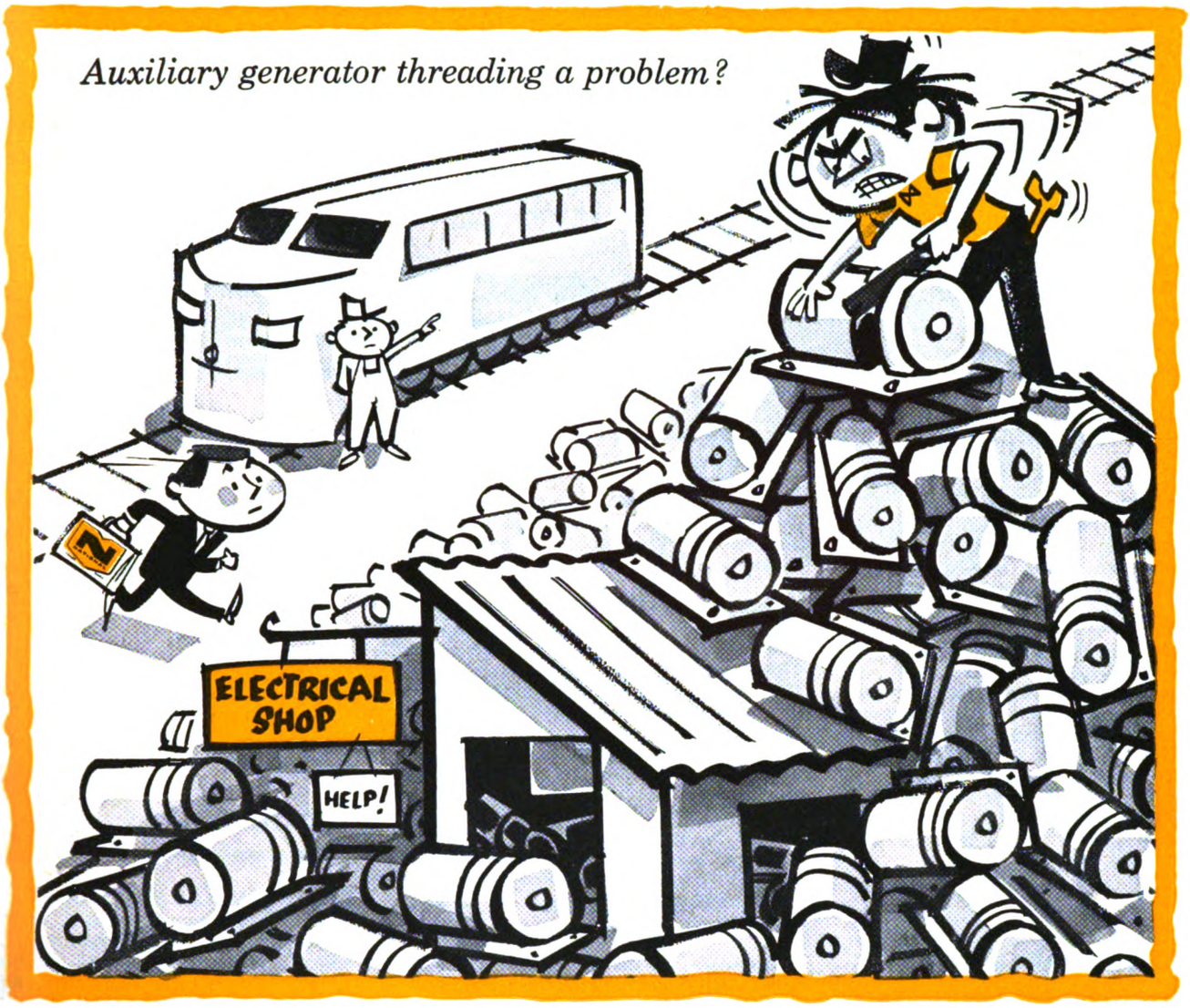
"TORQUE WRENCH MANUAL



SENT UPON REQU

Formulas
Applications
Engineering Data
Screw Torque Data
Adapter Problems
General Principles

P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS
Manufacturers of over 85% of the torqu wrenches used in industry



Your NATIONAL brush man stopped costly auxiliary generator repairs!

JOHN GIBB

Extreme threading on auxiliary generators caused excessive commutator maintenance on this mid-western railroad. The brushes the road had been using could not handle widely fluctuating loads, says "National" Carbon Brush Man, John Gibb.

John recommended that a "National" brush be tested. Once the first results were in, John's fellow "National" Carbon Brush Men followed through with similar tests on roads all over the country. Tests showed greatly improved performance and lower maintenance costs.

This is typical of the service National Carbon makes available to the nation's railroads. There are twenty-seven "National" Carbon Brush Men in the field ready to assist with any brush problems you might encounter.

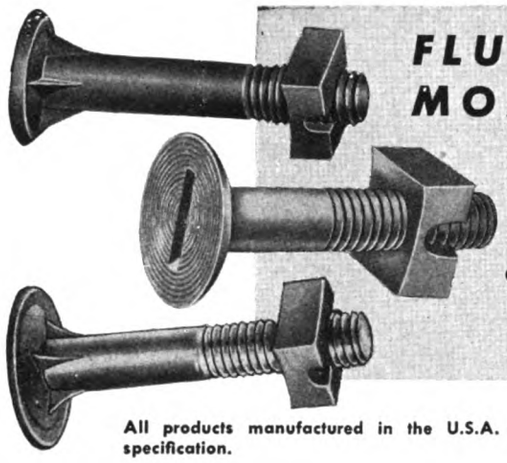
Call on your "National" Brush Man today. Or write: National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

The terms "National", "N" and Shield Device, and "Union Carbide" are registered trade-marks of Union Carbide Corporation

NATIONAL CARBON COMPANY • Division of Union Carbide Corporation • *30 East 42nd Street, New York 17, N. Y.*

UNION CARBIDE

Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. *In Canada:* Union Carbide Canada Limited, Toronto.



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MOISTURE
TIGHT..

...WITHOUT
COUNTERSINKING

Lewis sealtite car bolts

Each Lewis Sealtite car bolt has special "wood engineering" beveled head for flush, moisture tight, fit . . . without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning . . . slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

All products manufactured in the U.S.A. to A.S.T.M. specification.

Lewis BOLT & NUT COMPANY
504 Malcolm Ave. S. E.
MINNEAPOLIS 14, MINNESOTA

LOOK FOR THIS STAMP OF U QUALITY

(*Continued from page 18*)

and Fuel Oil, dated September 1957, revised December 1957. It is the AAR's thought that use of this manual would reduce cost of testing lubricating oil and fuels, improve quality of such work, and permit comparison of work of all testing agencies to provide a coordinated system of applied research. By having a uniform code of conducting tests and reporting results, tests conducted on one railroad may be interpreted by other railroad's personnel eliminating need of duplicate testing. *F. H. Stremmel, secretary, Mechanical Division, Association of American Railroads, 59 East Van Buren st., Chicago 5. To members, $2.00 each; to other than members, $4.00 each.*

Personal Mention

Atchison, Topeka & Santa Fe.—*San Bernardino, Calif.:* R. J. GREGORY transferred from Albuquerque to Los Angeles Division shops as general car foreman.

Baltimore & Ohio.—*Baltimore:* H. F. DEERY appointed road foreman of engines, Baltimore Division.

Chesapeake & Ohio.—*Richmond, Va.:* E. R. HAUER, general mechanical engineer, retired. T. P. HACKNEY, JR., appointed mechanical engineer. E. F. STARK, JR., appointed shop engineer.

Chicago, Milwaukee, St. Paul & Pacific—*Savanna, Ill.:* Duties of W. W. HENDERSON, master mechanic, extended to include supervision over locomotive department matters on the Madison Division, except Madison, Wis. This is a correction of announcement in March issue. *Milwaukee:* Duties of W. N. BITTNER, shop engineer, extended to include supervision over Milwaukee wheel and forge shops and Tomah, Wis., shop.

Missouri Pacific.—*St. Louis:* J. H. THOMAS appointed assistant to chief mechanical officer. G. V. GLENN appointed supervisor of diesel equipment, succeeding W. P. SULLIVAN, retired.

Pennsylvania.—*Morrisville, Pa.:* LOUIS V. TOWNSEND, enginehouse foreman at Northumberland, Pa., appointed enginehouse foreman, succeeding HUGH M. WYROUGH, retired.

St. Louis-San Francisco.—*Tulsa, Okla.:* E. W. BROWN appointed road foreman of equipment. *Fort Smith, Ark.:* N. C. SWEETIN appointed road foreman of equipment.

Obituary

John Jackson, former engineer of tests, Missouri Pacific, died suddenly on March 6 in St. Petersburg, Fla.

John P. Morris, retired general manager of ... mechanical department, Santa Fe, died in the Redlands Community Hospital, Redlands, Calif., on February 20.

Supply Trade Notes

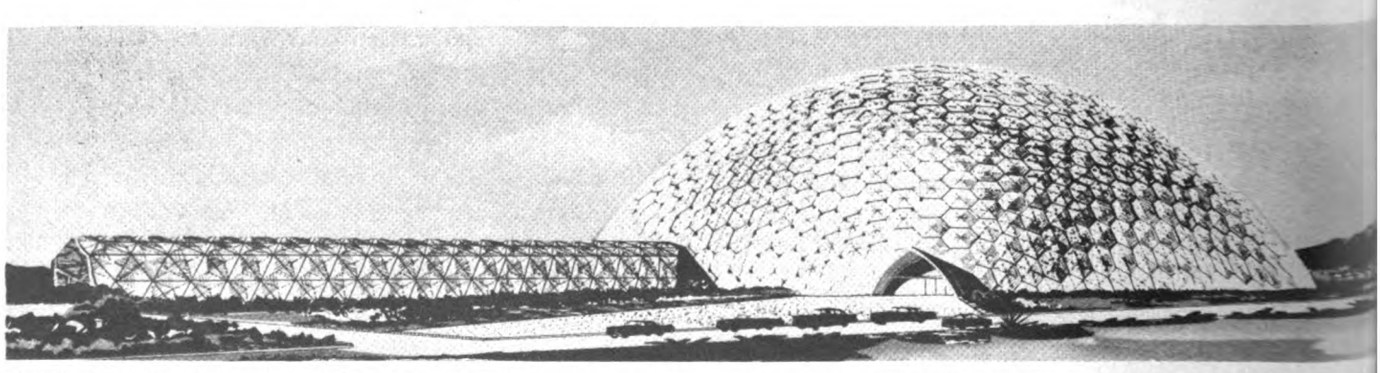
NEW YORK AIR BRAKE COMPANY.—*R. C. Howell*, service engineer in southern territory, has been transferred to Chicago as special representative. *J. M. McLaughlin*, former supervisor car department, Seaboard Air Line, succeeds Mr. Howell as service engineer in Atlanta, Ga.

■

AMERICAN CREOSOTING CORPORATION. — *Harry W. Foster* has been appointed to the sales staff of American Creosoting, for the midwestern area.

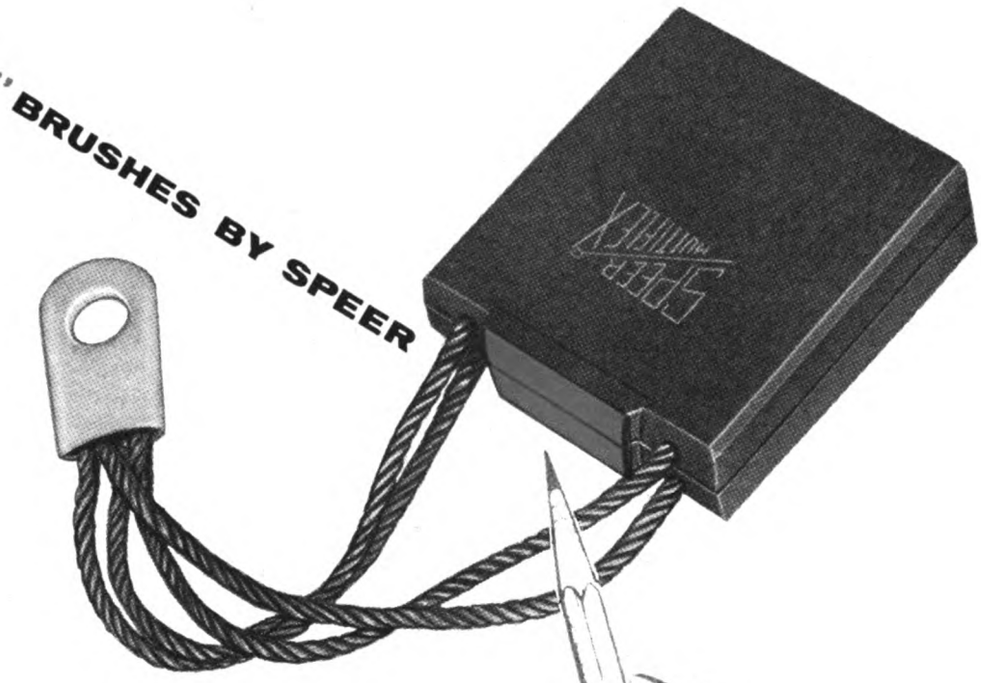
■

WINE RAILWAY APPLIANCE COMPANY.—*George B. Christian*, vice president, sales, retired on March 1.



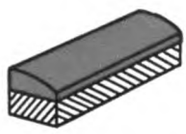
Artist's conception of the all-steel "Union Dome," said to be the world's largest circular building without internal supports, which is being built in Baton Rouge, La., by the Union Tank Car Company of Chicago. The 10-story high geodesic structure (right) is 375 ft across its interior base and 116 ft high at its center. A special paint area (left) is 200 ft long and ... high. The cost of the dome and the tank car repair facilities it will ... in excess of $1,000,000, considerably less than the conventional car ... shop of this size. The project is scheduled for completion in mid 195...

NEW "RED CAP" BRUSHES BY SPEER



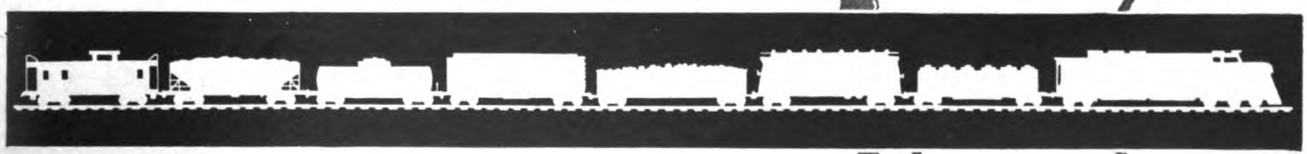
On your most rugged haul, try Speer's new "Red Cap" brushes. They are made to stand up under the toughest conditions of vibration, sudden shocks, rough roadbeds and long-haul running. Special double-duty shock absorbers take the beating...brushes themselves aren't touched. Results are longer brush life (breakage and shunt-fraying virtually eliminated), maintenance-free service, improved commutation and real long-haul reliability.

"Red Cap" brushes are yet another example of Speer's leadership in brush design. There's a Speer brush exactly right for every railroad application. Write today for details.



How "Red Caps" Work

Specially designed hard rubber cap, laminated to softer neoprene pad, is mounted at top of brush. Initial impact of vibration and shocks is broken by hard cap. Design insures even distribution of remaining pressures over entire surface of soft underpad, allowing full absorption of vibration and shocks with minimum of compression. Hard cap also resists wear and indention by spring finger, permitting free movement and most efficient operation of brush throughout its life.



SPEER Carbon Co.
St. Marys, Pennsylvania

Supply Trade Notes

(*Continued from page 74*)

ELECTRIC STORAGE BATTERY COMPANY. — The Exide Industrial Division of Electric Storage Battery has become the exclusive marketing organization for battery-charging equipment manufactured by the *Electric Products Company,* Cleveland.

■

INDUSTRIAL BROWNHOIST CORPORATION. — *Frank McBride* has been appointed district sales manager at Cleveland. *William D. South, Jr.,* succeeds Mr. McBride as a sales representative in the Philadelphia office.

■

CHAMPON RIVET COMPANY. — *Joe De Santo* has been appointed manager of welding sales, Chicago section.

■

CRANE COMPANY. — *William O. Brown,* manager west coast sales district, has been appointed general manager of sales at Chicago.

■

MacLEAN-FOGG LOCK NUT COMPANY. — *James G. Eliasek* has been appointed representative in southeast states with headquarters in Richmond, Va.

■

INTERNATIONAL EQUIPMENT COMPANY, LTD. — International Equipment of Montreal has concluded arrangements for the manufacture and sale in Canada of all railway products of the *Keystone Railway Equipment Company* of Chicago.

F. S. Downs

J. Jarvie

R. Aldag

R. J. Hondlik

AIR REDUCTION SALES COMPANY. — *Fred S. Downs,* railroad sales representative, has been appointed zone manager, Railroad Sales, Eastern Region, succeeding *C. B. Armstrong,* retired.

■

EX-CELL-O CORPORATION. — *James Jarvie,* a sales representative, has been appointed general sales manager of Ex-Cell-O's Industrial sales organization in Toronto, Canada.

■

FAIRBANKS, MORSE & CO. — *Robert Aldag,* manager of the sales engineering department, has been appointed manager of the Railroad Division.

■

GENERAL MOTORS CORPORATION, ELECTRO-MOTIVE DIVISION.—*Richard L. Terrell* has been appointed administrative assistant to the general manager, succeeding *George W. Elsey,* retired. *Raymond H. Bish,* manager of manufacturing services and facilities, has been appointed works manager, succeeding Mr. Terrell. *George D. Bai* manufacturing manager of the La Gran Ill., plant, has been appointed assistant wor manager. *R. J. Hondlik,* assistant manage parts sales, has been appointed parts sa manager, succeeding *M. Anderson,* retired.

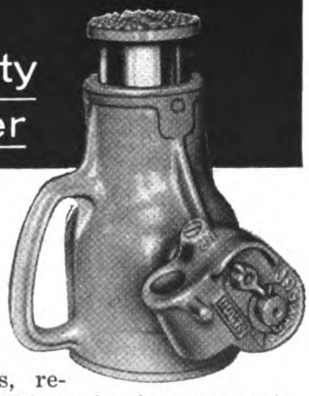
■

PULLMAN-STANDARD CAR MANUFA TURING COMPANY. — *Oscar E. Rothfu* has been appointed assistant manager works, and *M. B. Burns,* general super tendent at Michigan City, Ind., succeedi Mr. Rothfuchs. Mr. Burns was previou assistant general superintendent.

■

ELECTRIC STORAGE BATTERY COM PANY. — *John R. Smyth,* chief control en gineer, has been named to the newly creat post of assistant director of engineerin Exide Industrial Division. *Lowell K. Lemb* has been appointed railway markets supe visor. He was formerly a sales and servi engineer in Kansas City, Mo.

WESTERN
LOCOMOTIVE and CAR
JACK
lifts capacity
loads easier



WESTERN has made the first major change in Locomotive and Car Journal Jacks by adding TIMKEN tapered thrust roller bearings, replacing ball bearings. This major improvement means reduced friction, greater speed, easier operation and less maintenance . . . available in 25, 35 and 50 ton capacities. Aluminum or malleable steel housings available in 25 or 35 ton models.

8018

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America's foremost engineered lettering tools

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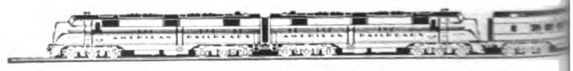

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ELPS FROM ANUFACTURERS

following compilation of literature—including nphlets and data sheets—is offered free to road men by manufacturers to the railroad ustry. To receive the desired information te direct to the manufacturer.

ILL GRINDER. 4-page Bulletin 4400 cribes the Sellers principle of drill grinding well as the design and construction fea- es of the Sellers 10-G drill grinder for nding 1¾-in. to 5-in. diameter drills. rite: *Consolidated Machine Tool Division, rell-Birmingham Company,* Dept. RLC, Blossom Road, Rochester 10, N. Y.)

BRICATION EQUIPMENT. Catalog 92 tures lubrication fittings, grease guns, tralized power lubrication systems and essories, with dimenson drawings. (Write: *coln Engineering Company,* Dept. RLC, 2-14 Natural Bridge ave., St. Louis 20.)

TALYTIC PROTECTIVE COATINGS. age booklet describes the adaptability of O catalytic protective coatings for a wide ge of industrial usage. (Write: *Industrial ishes Co.,* 1119 Land Title Building, ad and Chestnut sts., Philadelphia 10.)

ECISION ENGINEERED BELLEVILLE INGS. 12 pages, color, illustrations, dia- ns and design data. Contains information use of coned disc springs, including for- ae for linear load-deflection curve springs. rite: *Union Spring & Manufacturing Co.,* t. RC, New Kensington, Pa.)

MOGENEOUS PACKINGS.—4-page Bul- t AD-163 describes uses, pressure, con- ction, available sizes, and procedures for allation of Garlock line of homogeneous ap packings. (Write; *Garlock Packing npany,* Dept. RLC, 420 Main st., Palmyra, Y.

JSHES.—12-page bulletin, "Brushes for trical Rotating Machinery," describes com- e line of carbon and graphite brushes gives detailed information on selecting right brush for a special job. Separate ons devoted to brushes for alternating direct-current equipment. (Write: *Speer bon Division, Speer Carbon Company,* t. RLC, St. Marys, Pa.)

NGS.—58-page booklet contains sections Braided Safety slings, Brolock slings, dard slings, sling fittings, load capacity s, instructions on their use, and a section how to order. (Write: *Broderick & om Rope Co.,* Dept. RLC, 4203 Union ., St. Louis 15.)

VELD CUTTING MACHINES.—28- catalog (Form 4487) covers complete of Oxweld flame-cutting machines ranging ize from small portable units to large i-blowpipe cutting machines. Includes complete specification for each machine, rations of typical installations, and a iption of machine accessories such as matic and magnetic tracing units. (Write: *e Company, Division of Union Carbide oration,* 30 East 42nd st., New York 17.)

If money's no object — you can floor 'em with *gold*! But if you're budgeted closely, with lots of B and C cars to upgrade, then PLASTINAIL offers you:

1 — A super-smooth Class A floor

2 — That will outlast a new wood floor and remain in Class A service virtually all its life

3 — At as little as 2/3 the cost* of new wood.

*PLASTINAIL for ¾" coverage of a 40'-6" box car is only $138.

Installation time: approximately 20 man-hours.

Write, wire or phone for details

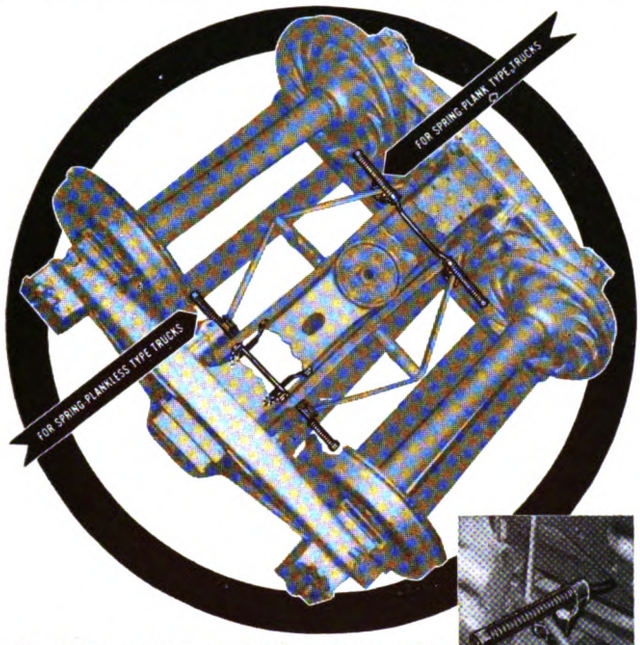
Plastinail*

OXYCHLORIDE CEMENT BOX CAR FLOORS

*Reg. T. M. of F. E. Schundler & Co., Inc.

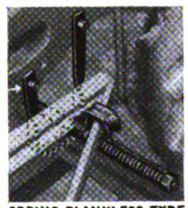
F. E. SCHUNDLER & CO., INC., 504 Railroad St., Joliet, Ill.

THE IMPROVED GRIPCO
BRAKE BEAM SAFETY SUPPORT



SPRING-PLANK TYPE

The Gripco Brake Beam Safety Support provides the greatest safety at lowest cost. Its dependability has been proven over years of actual service. **Gripco Safety Supports are low in original cost, low in application cost and low in maintenance cost, even after years of service.**



SPRING-PLANKLESS TYPE
(Safety Loops Included)

ENGINEERING IMPROVEMENTS

1. One design fits both 5'-6" and 5'-8" wheel base trucks.
2. One rod length and one spring length. One interchangeable casting fits both spring plank and spring plankless trucks.
3. Ideal for interchange repairs. New design permits easy and fast applications under all conditions. Nuts need not be removed to apply or remove the support.

OUTSTANDING FEATURES

1. An inexpensive trouble-free support for Rebuilt Car Programs.
2. Designed for spring plank and spring plankless trucks. Spring plankless trucks require safety loops which can be bolted, riveted or welded to the bolster.
3. Supports the brake beam in the event of brake beam or hanger failure.
4. Holds brake beam in horizontal position.
5. Holds brake shoe in proper position in relation to the periphery of the wheel.
6. The brake release feature pulls brake shoes away from wheel contact instantly when brakes are released.
7. Prevents unnecessary wheel and shoe wear caused by dragging brake shoes.
8. GRIPCO supports can be removed and reapplied without removing nuts; therefore nuts are furnished in proper position.
9. Brake beams, rods, and levers are held in position under spring tension thus reducing false movements, chattering and wear of hangers, hanger pins and brake heads.
10. Can replace as a billable repair any support except A.A.R. recommended practice (angle-riveted and welded).

A.A.R. APPROVED—PATENTED AND PATENTS PENDING

OTHER GRIP NUT PRODUCTS AD NO. 110

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Broderick & Bascom Rope Co. 9

Cincinnati Grinders, Inc. 2

Demp-Nock Company 7

Esso Standard Oil Co. 6
Ex-Cell-O Corporation 5
Exide Industrial Division-Electric Storage Battery Co. 2

Fairbanks-Morse & Co. 1

Gardner-Denver Company 4
General Steel Castings Company 1
Grip Nut Company 7
Gulf Oil Corporation 48, 4

Hamilton Division, Baldwin-Lima-Hamilton Corporation 4
Huck Manufacturing Company 5

Ideal Industries, Inc. 7
Institute of Thread Machiners, Inc. 1
International Nickel Company, Inc. 1

Journal Box Servicing Corporation 4
Joy Manufacturing Company ..... Inside Back Cover

Kershaw Manufacturing Company, Incorporated 6

Lewis Bolt & Nut Co. 7
Lix Corporation 6

Magnus Metal Corporation 52, 5
Metal Finishers, Inc. 6
Miller Lubricator Co. 5
W. H. Miner, Inc. ..... Inside Front Cover

National Carbon Company, Div. of Union Carbide Corp. 7
National Elecrtic Coil Company 3
National Malleable & Steel Casting Co. 16, 1

Pullman Standard Car Mfg. Co. 1

Schundler & Co., Inc. F. E. 7
Shell Oil Company 1
Sinclair Refining Company 22, 2
Snap-On-Tools Corporation 7
Speer Carbon Co. 7
Standard Car Truck Company 5
Standard Car Truck (Clevite Div) 6
Standard Oil of California 3
Standard Railway Equipment Co. 5
Stran-Steel Corporation, Unit of National Steel Corporation .....
Stratoflex, Inc. 6
Sturtevant, P. A. 7

Timken Roller Bearing Co. ..... Back Cover

Union Carbide Corporation, National Carbon Co. 7
United States Graphite Co. .....

Waukesha Motor Company .....
Western Railroad Supply Co. 7
Wine Railway Appliance Co. 40, 4
Wyandotte Chemicals Corporation 24, 2

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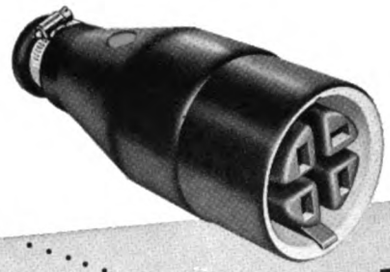

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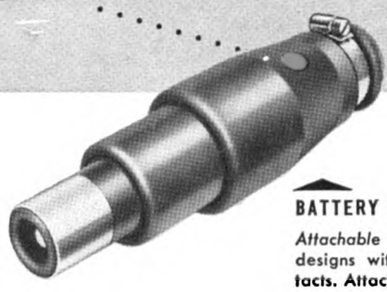
Attachable or *Molded-to-Cable* designs with replaceable contacts. Attachable plug illus.

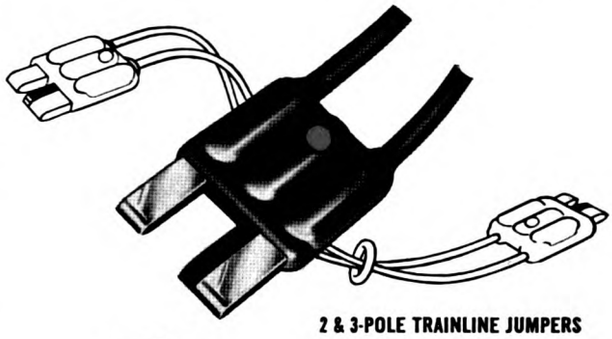
JOY CONNECTORS for CAR EQUIPMENT!



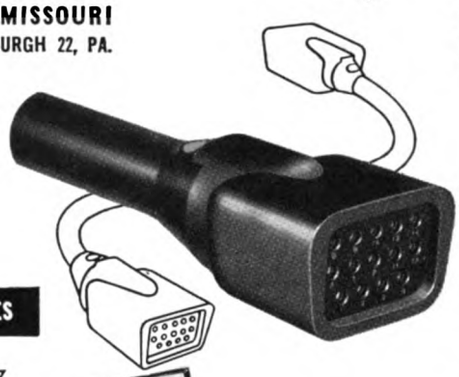
BATTERY CHARGING PLUGS
Attachable or *Molded-to-Cable* designs with replaceable contacts. Attachable plug illus.

If ease of installation, safety and dependable performance are important considerations in your selection of electrical connectors . . . JOY plugs and receptacles rate "top billing" on your "preference list." Factory molded as trim, rubber insulated/Neoprene jacketed units that are **absolutely safe to handle even in dripping wet installations . . . they're shatterproof, distortion-resistant and practically immune to damage by oils, grease and car washing solutions.**

Complete details on JOY connectors for Car equipment as well as many other railway needs may be found in Bulletin #B64. If you haven't received your copy, or need extra copies . . . please fill out and mail the coupon below to:



2 & 3-POLE TRAINLINE JUMPERS
Neoprene/rubber insulated. 2-pole unit illus.



14-POLE R. R. JUMPERS
For car communication and entertainment circuits.

MATING RECEPTACLES
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PRODUCT/APPLICATIONS	PAGES
STAND-BY SERVICE	4-7
CAR EQUIPMENT	**8-15**
DIESEL EQUIPMENT (Including Traction Motor Sleeves)	16-21
ROTARY SAND DRYERS	22-23
PORTABLE LIGHTING (SAL)	24-28
SPECIAL APPLICATIONS	29-36

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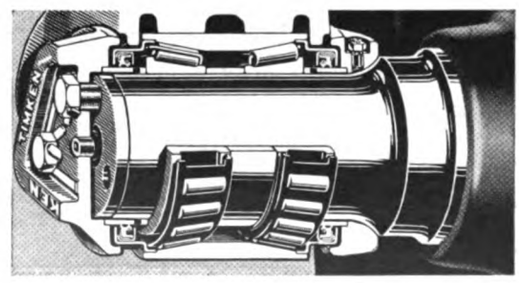

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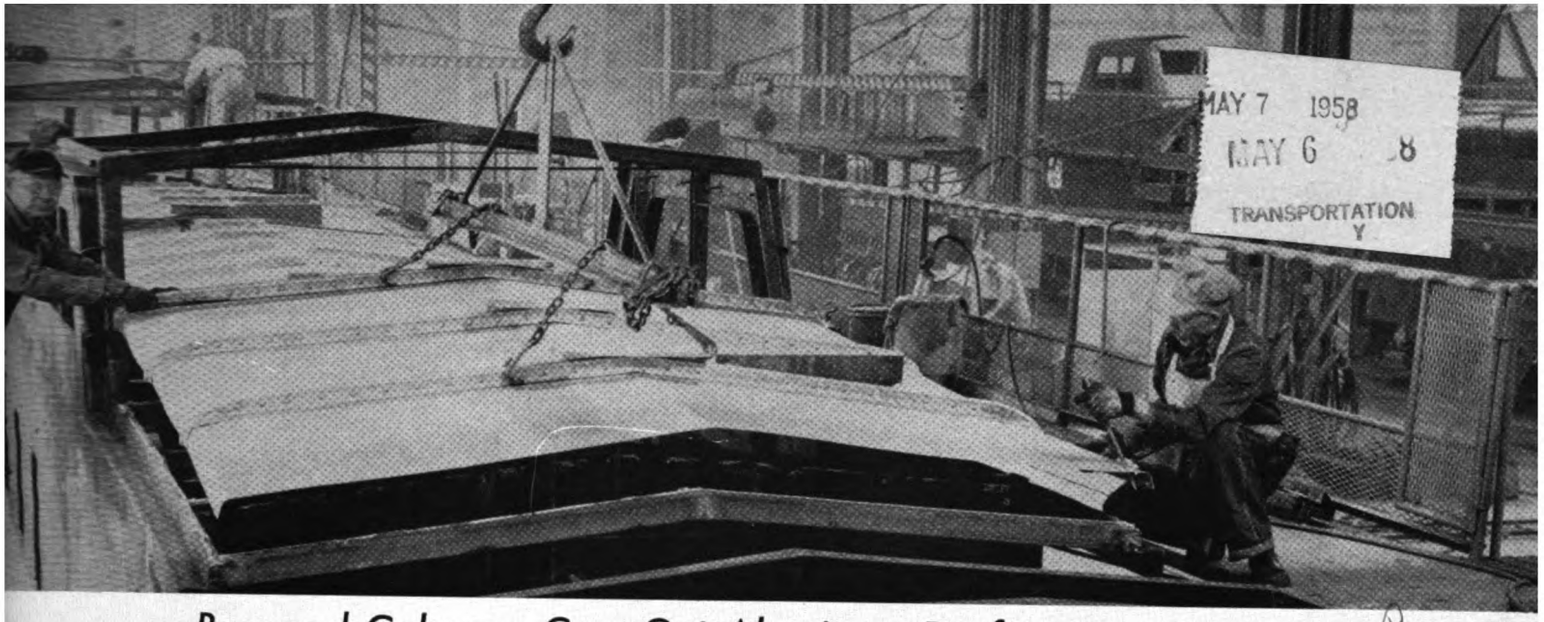

MAY 7 1958
MAY 6 8
TRANSPORTATION
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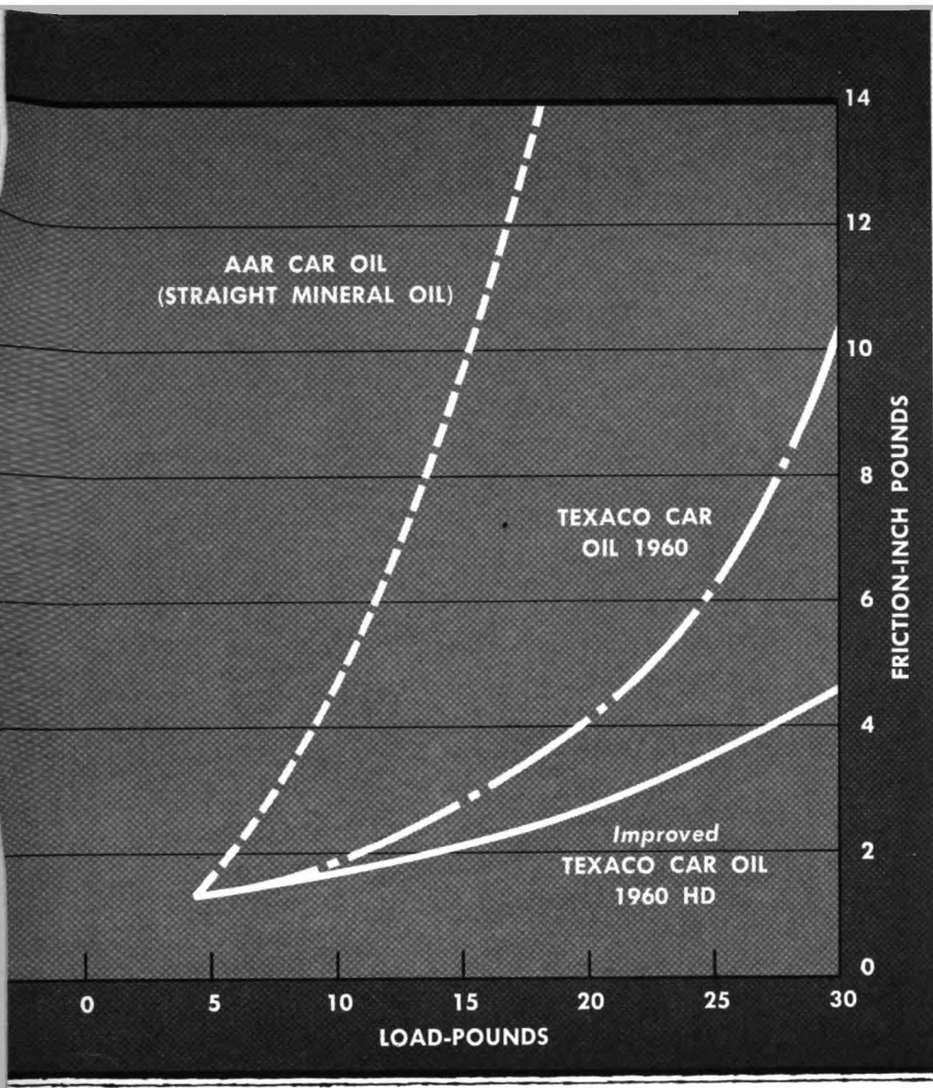
Box and Caboose Cars Get Aluminum Roofs... Page 10

AILWAY
LOCOMOTIVES AND CARS
A SIMMONS-BOARDMAN TIME-SAVER PUBLICATION MAY 1958

DIRT IN DIESELS

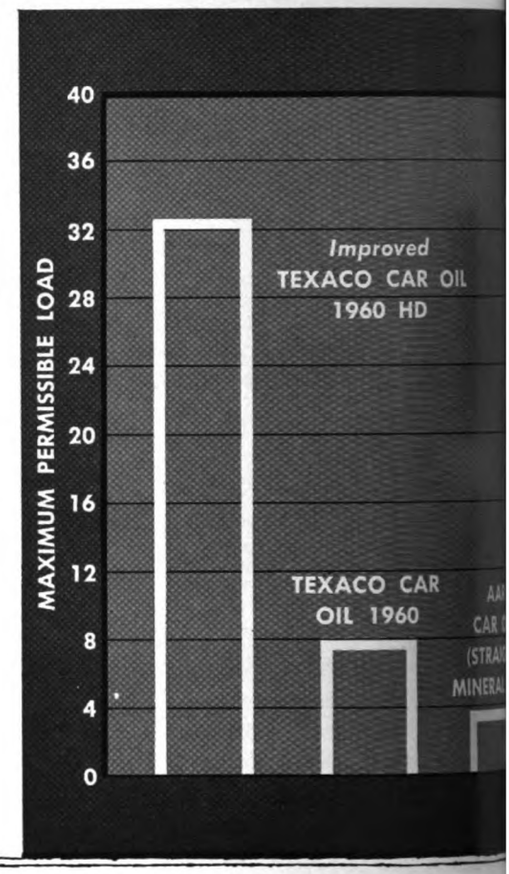
What it does... What it costs

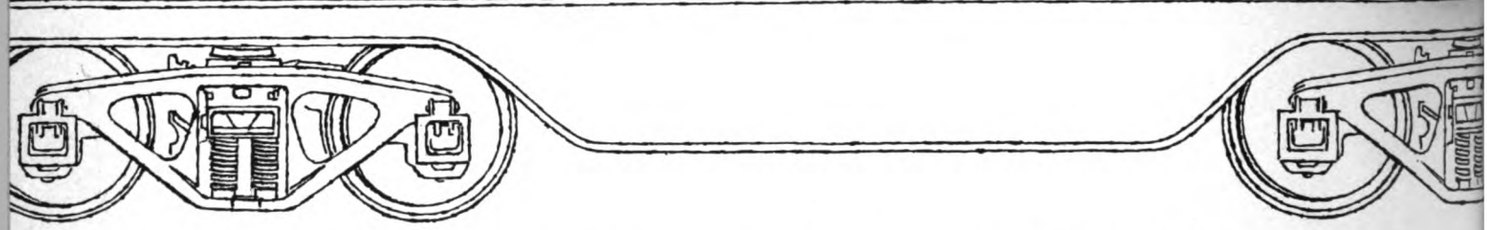
What you can do... page 29



IMPROVED FRICTION CHARACTERISTICS of Texaco Car Oil 196 are graphically illustrated here. Small-scale testing equipment AAR babbitt and steel pins.

HIGH WEAR RESISTANCE of new Texaco Car Oil 1960 HD possible extremely heavy loads. Special additives prevent mo ing of babbitt under stress.





Comparison tests prove Texaco Car Oil 1960 HD

CUTS HOTBOX RATE

Real differences do exist among car oils. Wicking rate, load-carrying capacity and friction characteristics, all affect lubricant performance, and consequently, hotbox rate.

New and improved Texaco Car Oil 1960 HD is an optimum combination of the above three characteristics. In addition to the lab results shown here, actual field tests on leading railroads have already indicated the new oil's superiority.

Special additives are responsible for this performance record. To prove the additives' anti-friction properties, for example, Texaco development engineers used a unique railroad journal bearing test machine. Adjusting this equipment to severe conditions, they operated it on an ordinary AAR non-additive car oil to establish a coefficient of friction of 0.1. Then while the machine was still in operation, the oil supply was changed over to Texaco Car Oil 1960 HD – and the coefficient of friction dropped to .005!

Ask your Texaco lubrication specialist for a complete report of Texaco Car Oil 1960 HD – and let him show you what it can do for your operation. Or write:

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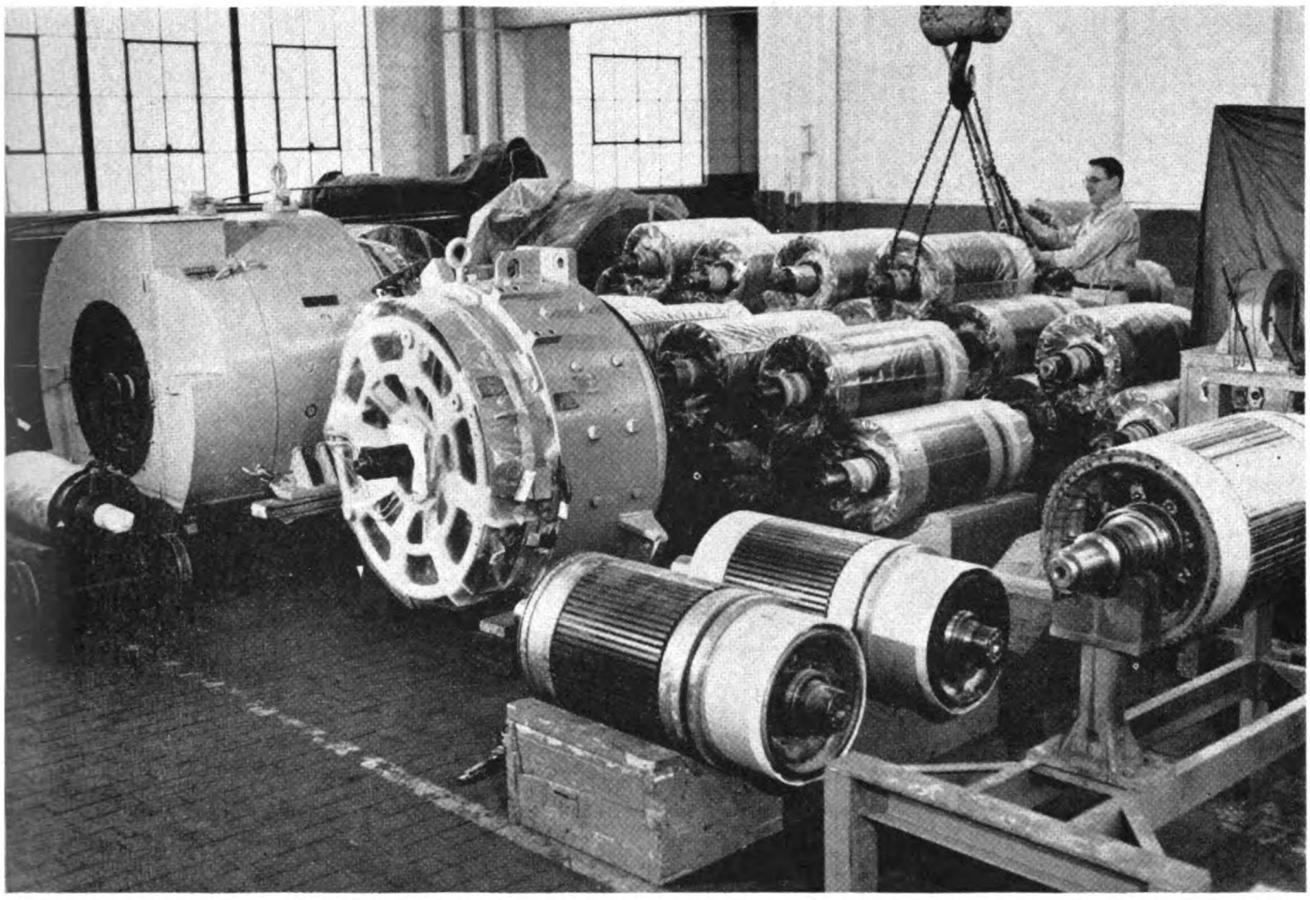

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Really, if you can't feel that way about your job, the company's wrong or you are miscast in your work. Either way, see to it that you're *happy* doing a heaped-up-and-running-over kind of job.

The same point of view applies to a manufacturer's relations with his customers. We at Adlake like "workin' on the railroad". While we are human, and make mistakes, we like to think that we are doing a well-above-average job for our boss.

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*Elbert Hubbard

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TIME-SAVING IDEAS FOR

MAY 1958

Volume 132 • No. 5

MOTIVE POWER AND CAR

ASME-AIEE CONFERENCE DISCUSSES DIRT IN DIESELS:

Dirt in Diesels Costs $138,733,385 Yearly 29
J. W. Horine, electrical engineer, Pennsylvania, estimates the cost of removing dirt from locomotives and the price paid for that which gets in.

How Much Air Filtering Can You Justify? 30
Railroads cannot afford to keep all dirt out of their locomotives, but some additional filtering may easily pay for itself.

Electrostatic Precipitator Cleans Engine Air 32
B&O has conducted two years of road tests proving that this novel filtering system can be successfully operated on a locomotive.

How Much Cleaning Can You Afford To Do? 34
The secret of economical locomotive cleaning is to do only that necessary, at the proper location, and at the right time.

Pete's Average Goes Down 37
A perplexing mechanical refrigerator car problem is solved in only a few minutes when Pete gets there.

Union Pacific Tests Pullman's PAT Piggyback 38
Pullman-Standard and Trailmobile have teamed up to produce a new container concept which is now undergoing its first tests.

NYC Begins Flexi-Van Operations 39
New York Central finally begins piggybacking with novel container-type equipment worth $8,000,000.

What Next for Solid Bearings? 40
Five steps which should improve the performance of the present standard journal bearing without excessive investment are discussed here.

ELECTRICAL

Portable Control for Locomotives 48
Canadian Pacific had this device developed as one step in its program to eliminate firemen from freight and switching locomotives.

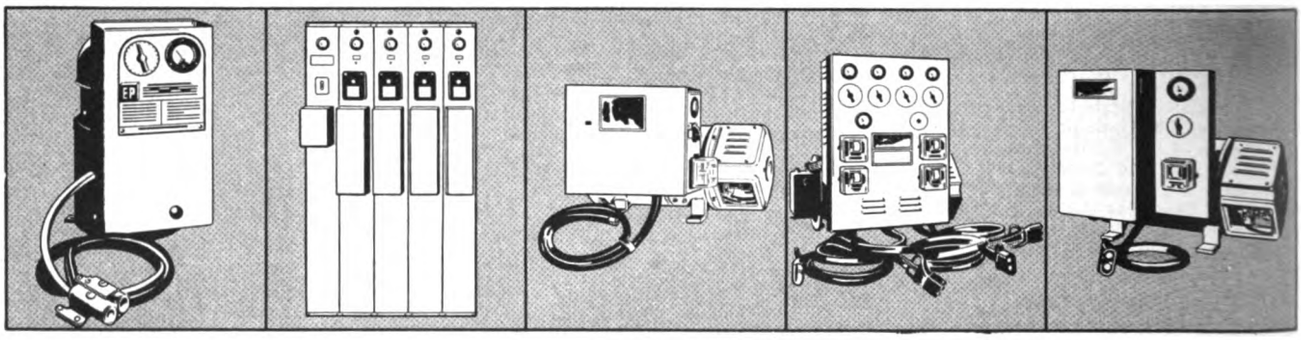
DC High Potential Testing Has Been Improved 50
How to perform new insulation tests and how to interpret the results are both important to men doing motor and generator maintenance.

The Diesel Seemed To Be Starved for Fuel 54
Our Diesel Maintainer's Notebook shows how a road failure was caused and what can be done about it.

DEPARTMENTS

Report	10	Car Repair Time Savers	44
Personal Mention	14	Supply Trade Notes	56
What's New in Equipment	18	Helps from Manufacturers	68

EXIDE TO MARKET ALL ELECTRIC PRODUCTS CO. CHARGERS



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Write for complete technical details and prices. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

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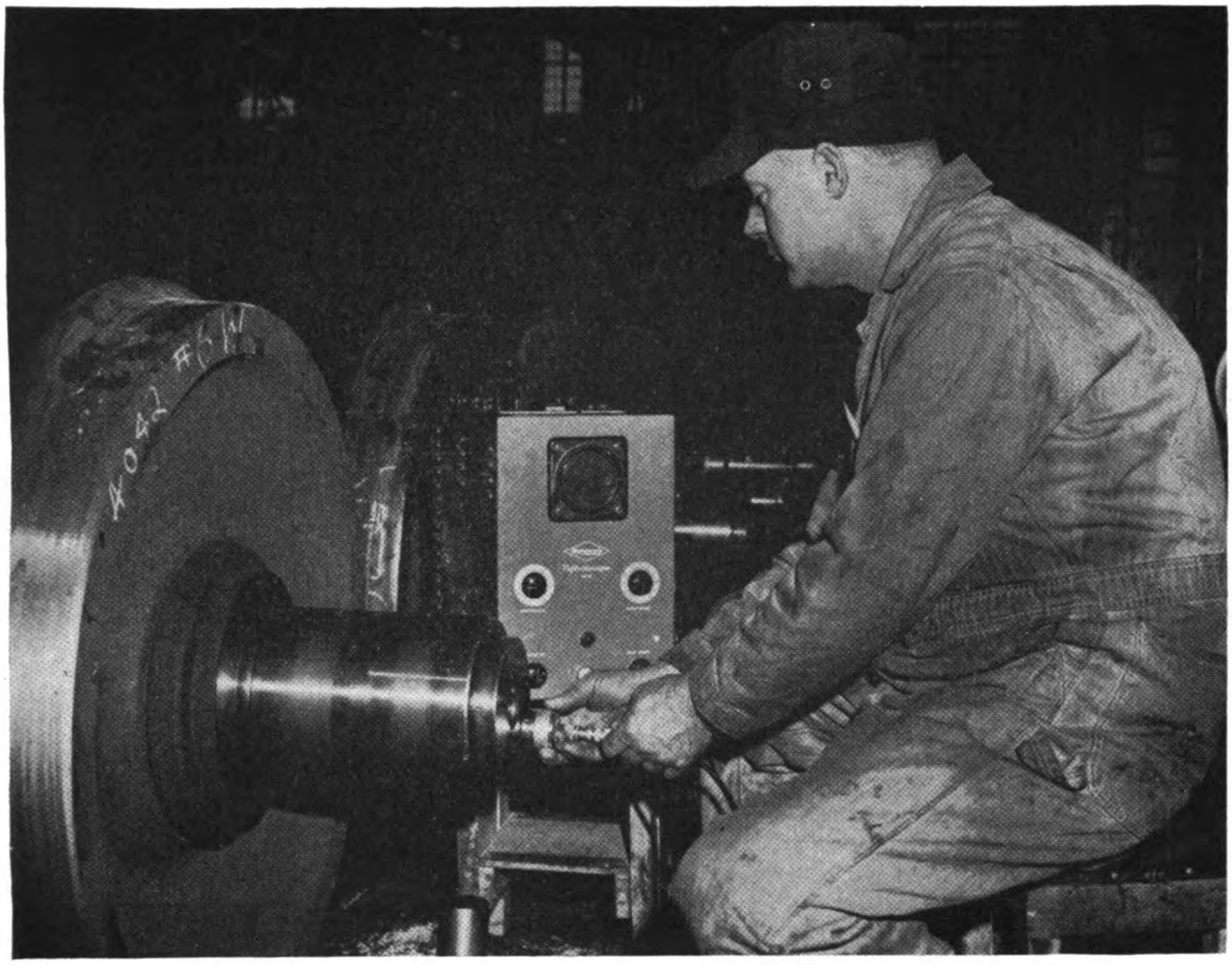

New SPERRY REFLECTOSCOPE cuts time and cost on axle testing

Designed specifically for railroad use, the Type US Sperry Reflectoscope offers a faster, simpler, more accurate and more economical means of testing. Axles can be tested "in place" on locomotives or cars, resulting in major maintenance economies by detecting hidden flaws before they cause costly failures or breakdowns.

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Sperry Reflectoscope Type US is another fine example of Sperry Rail Service's "engineering exclusively for railroads." If you're interested in cutting maintenance costs and achieving maximum equipment utilization, send for details of this outstanding inspection tool.

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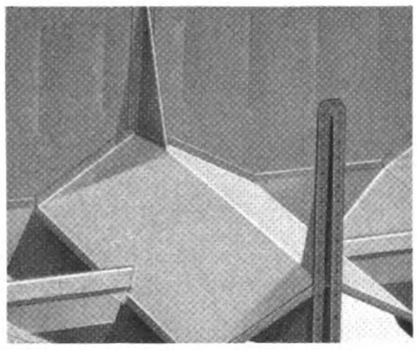
DURABILIT

another built-in bene

THE PS-3 Standardized Open Hopper is a prime example of the reserve durability, the *extra* quota of trouble-free service built into the Pullman-Standard line.

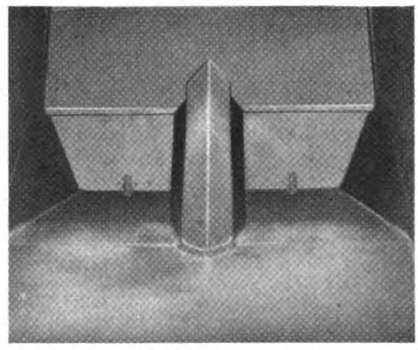
Hopper cars, in addition to normal hard service during interchange, must be able to stand up under sledge-hammer blows, shake-out machine and rotary dumper abuse, pounding from clam shells, plus the corrosion and abrasion caused by many types of bulk lading. Reserve durability in every part enables the standardized PS-3 to meet today's rugged demands, keeps it on the job day after day—ready to roll, capable of fast, efficient handling of all types of lading. And it holds future repairs to a minimum.

But reserve durability is only one built-in benefit—first cost economy, shipper acceptance, maintenance simplicity—all these and more are part of every P-S car. Write for copies of the booklets on each of the P-S line—PS-1, PS-2, PS-3, PS-4 and PS-5—they will give you complete details on each car and its benefits.



Reserve Durability—Cross Ridge Brace

The PS-3 inside cross ridge brace is formed of heavy 5/16" plate and, in combination with the side sheet and side post, forms an extremely strong section that contributes to floor support and prevents side bulging. Automatic arc-welding of floor sheets to the crossridge web and cap provides a well-supported surface in this vital area. Brace is solid, smooth and rounded to prevent damage from clam shell fouling.



Reserve Durability—Strong Floor Sheets and Hopper Chutes

PS-3 floor sheets are of 5/16" plate and outside hopper sheets are 3/8". Flanged floor sheet edge at sides and longitudinal hood junctions are joined by fillet welds. This provides a smooth, clean interior—free of sharp corners, ledges and ridges that retain corrosive lading. Heavy-duty hopper chutes gives positive resistance to damage from sledges and fires used in cold weather unloading.

Reserve Durability—Welded S Construction

Outside location of side posts p smooth interior, greatly reducing possibilities and facilitating unloa PS-3 side posts are continuously a matically arc-welded to the side addition, they are arc-welded to t side of the top chord—providing sistance to shakeout machines. T sheets have vertical indentures t flutter and increase service life

PULLMAN-STANDARD

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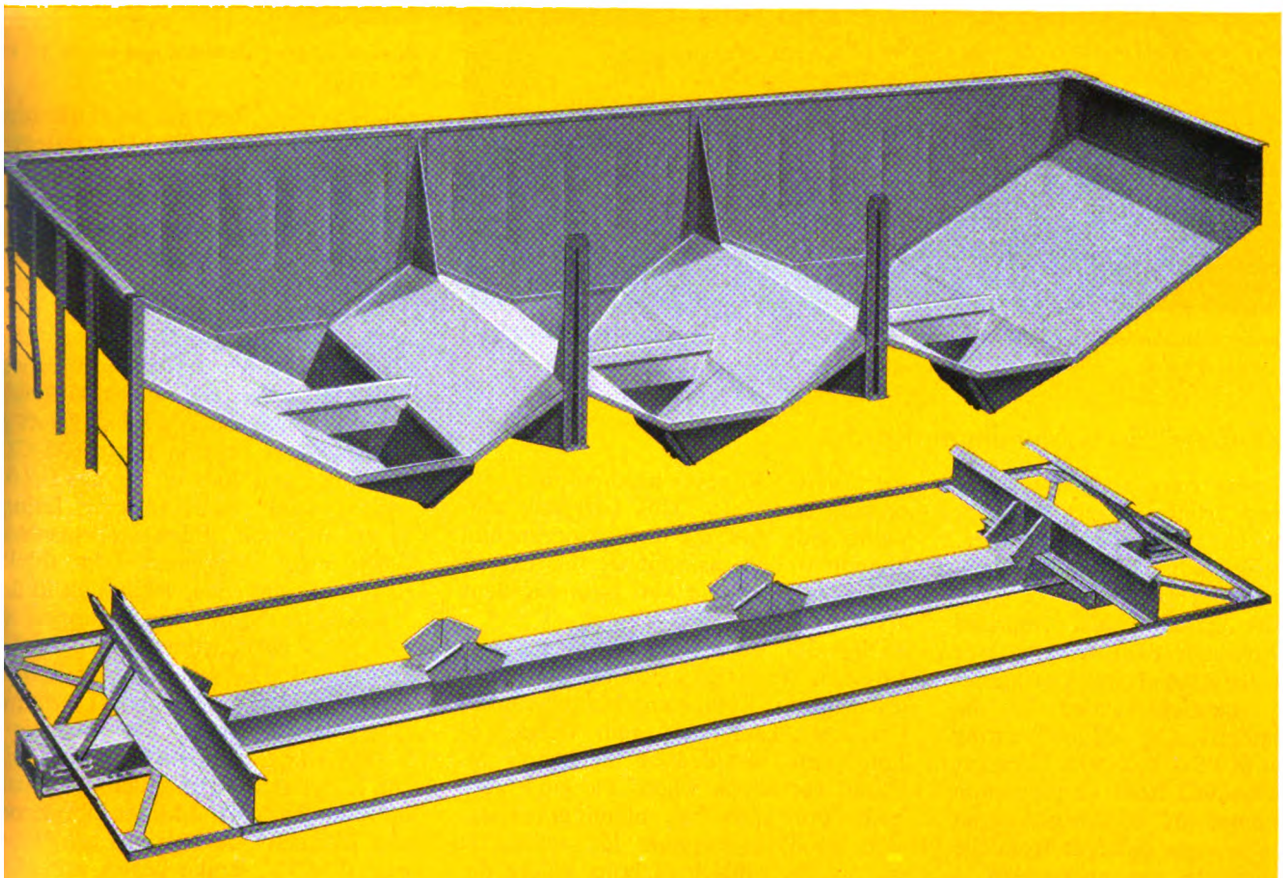


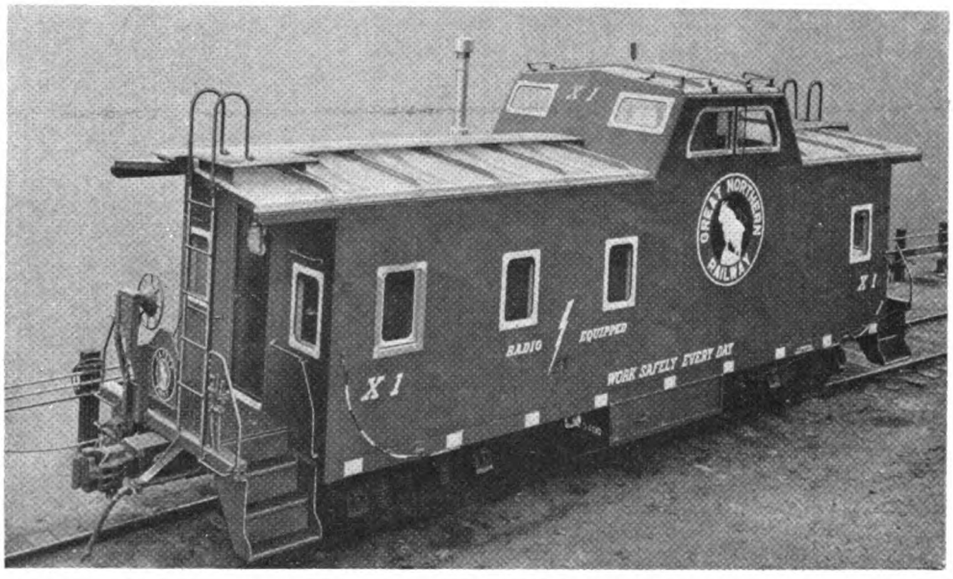
PS-3 HOPPERS

have these other extras that provide reserve durability

- Corners gain added strength from special inside corner band and cap.
- Hopper door frame is of strong, low-alloy, high-strength steel continuously welded to the outside of the hopper chute—mates with 3/8" formed hopper door providing tight, corrosion-resistant, long-lasting construction.
- Large bolster bottom flange and gussets provide a strong, durable center sill attachment which eliminates center sill shifting.
- Longitudinal hood is welded to floor sheet flanges eliminating danger of tearing common to butt fitted hoods All welds are smooth.

PS-3 available in 50-ton, 2143 cu. ft., 2-hopper and 70-ton, 2750 cu. ft., 3 hopper sizes.

LOCOMOTIVES AND CARS REPORT FOR MAY



Thirty GN cabooses have aluminum roofs fabricated by the Standard Railway Equipment Manufacturing Company.

Over 300 Cars Get Aluminum Roofs

Aluminum roofs were applied recently to 300 Grand Trunk Western box cars and 30 new Great Northern cabooses. Alcoa supplied alloy 5050 in 0.081-in. sheet for both orders.

The GTW box-car roofs comprised the largest number of this type ever produced in the United States of aluminum. They were fabricated by the Pullman-Standard Car Manufacturing Company to fit PS-1 box cars. Each car roof was assembled from 12 aluminum stampings joined by 11 formed seam caps. End pieces are different from the ten center units to give an overlap at these points.

The complete aluminum roof assembly saves more than 1,250 lb when compared with ferrous roofing alloys and the roofing will never need painting, according to Alcoa. This company also points out that the first experimental aluminum box-car roof in the United States, applied in 1944, is in excellent condition today.

The 360 roof sections for the GN cabooses were fabricated by the Standard Railway Equipment Manufacturing Company, Hammond, Ind. These sections were installed at the road's St. Cloud car shops where the cars were built. For each car, aluminum rivets were used to assemble 12 sections at seam caps, while lock bolts secure the roof to side plates. Seam caps were fabricated similarly from alloy 5052.

The Great Northern expects a much lower maintenance cost from the unpainted roofs because of aluminum's resistance to corrosion. The reflectivity of the unpainted roofs is expected to make the cars cooler under a hot summer sun. One aluminum box car owned by the railroad has been in service 2 years and has traveled two million miles.

Workers applying aluminum roof sheets to PS-1 box car.

The caboose underframe is welded construction, designed for Waugh Equipment Company's cushion underframe. The Z-26 center sill weighs 41.2 lb per ft and is continuously welded. Draft gear is Waughmat cushion type WM-CG-4. The sides and ends of car are 0.10 in. welded steel plate. Interior lining is ½-in. plywood. Fiberglass insulation, 1-lb density, is applied 3 in. thick in roof, sides and ends, 4 in. thick in floor.

Fifteen cabooses are equipped with General Steel Castings four-wheel caboose trucks, the balance with Standard Car Truck Barber-Bettendorf swing motion caboose trucks. The journals are 5 x 9, with 33-in. IWW wheels. Each car is equipped with Jeffers lubrication on seven journals, a Miller lubricator on one journal. Side bearings are Waugmat WMB-8. Brake beams are of two types: the AAR No. 18 non-unit and ASF unit cast. Type E couplers are used with Standard Railway Equipment release rigging.

"Radiation Area—Caution"

This sign appears on the side of Southern Pacific locomotive No. 5658. It is not an atomic locomotive, but it does contain radioactive isotopes and is at work for science on an out-of-the-way stretch of track in the SP's Bayshore shops at San Francisco.

Research engineers from the SP and the Standard Oil Company of California, who are cooperating in the project, say No. 5658 gives them as much wear data in six to eight hours as an ordinary locomotive could provide in six months to two years, with results showing a "surprisingly close correlation" with findings from the more time-consuming field tests.

Four of the 16 pistons in No. 5658 bear a ring which has been converted to a gamma ray-emitting isotope of iron. The rings are products of two weeks' irradiation in an atomic pile at the Argonne Laboratories near Chicago.

By controlling such variables as the type of lubricating or fuel oil, the temperature of the cooling water, the speed of the engines, the horsepower output, and the kind of air filtration, the many factors which influence engine wear can readily be evaluated.

In the running engine, the stream of lubricating oil carries away minute particles of wear metal from the rings and forces samples of the radioactive debris through a counting well. A bundle of Geiger tubes in the well continuously monitors the gamma-ray bombardment. A scaler counts the hits and an electric clock records them. Later, an electronic computer working on the clock's information tape comes up with a plot of wear rate.

Proper Maintenance of Freight Car Brake Hanger Details

In a recent circular to member roads the AAR calls attention to a considerable degree of laxness in applying brake hanger cotter

(*Continued on page 14*)

For safer, easier equipment cleaning . . .

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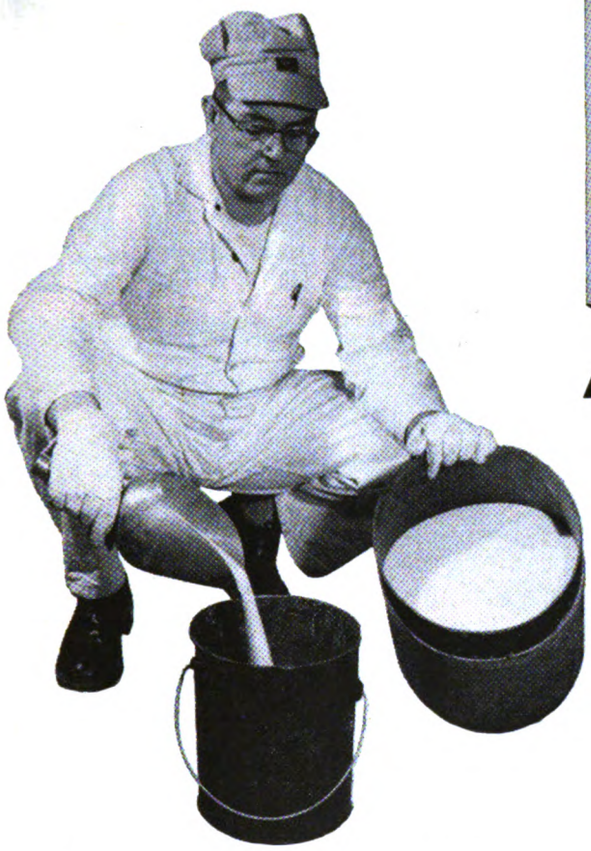
based on Du Pont sulfamic acid



• Cleaning compounds based on Du Pont sulfamic acid are handled *dry*, until they are dissolved for use.

New cleaning compounds made with sulfamic acid are sold and handled *dry*—no hazardous liquids to ship or store. Dry, or dissolved in water for use, they create no fumes. Yet these cleaners have all the penetrating power of hydrochloric acid with far less corrosive effect.

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We'll gladly send you more information on sulfamic acid-based cleaners and the names of formulators who offer these new compounds. Just mail the coupon below.

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Grasselli Chemicals Dept., N2533, Wilmington 98, Del.

Please send me: ☐ sulfamic acid general equipment-cleaning bulletin; ☐ names of formulators offering cleaners based on sulfamic acid.

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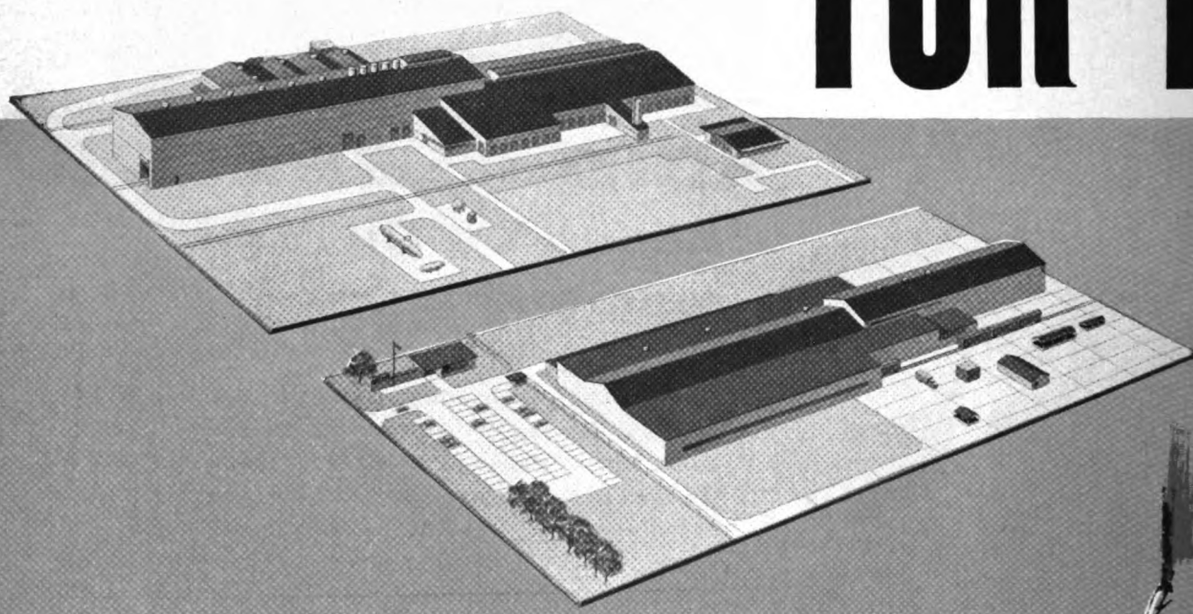
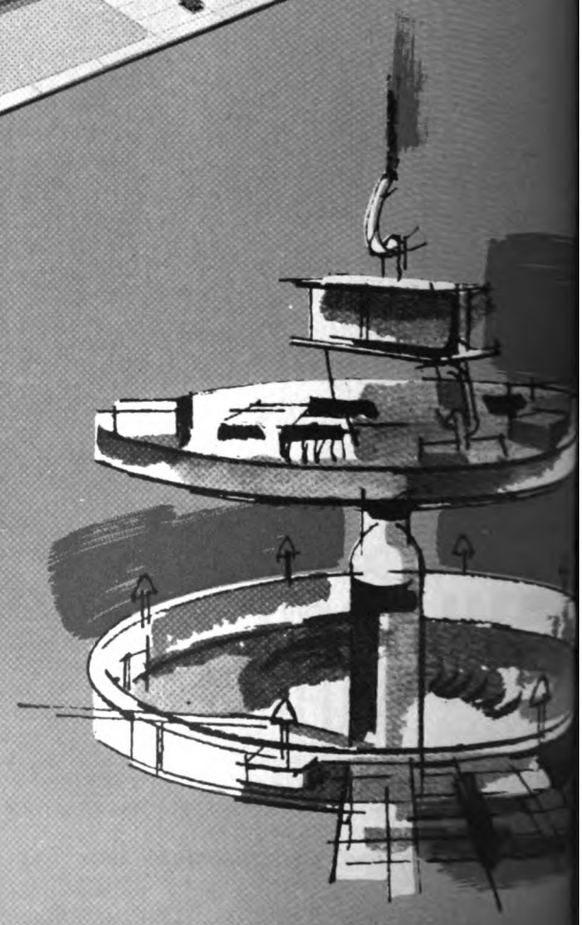


NEW PLANTS

With the Griffin EQS already AAR approved, the new Colton, Cal. plant is already in production, and new plants are now being built at Kansas City, Kansas and Transcona, Manitoba. In short, acceptance of the EQS is so complete that Griffin is still the world's largest producer of freight car wheels . . . still strategically located to provide you with the best of service!



Give the "green" to **GRIFFIN**
and watch your costs go down!

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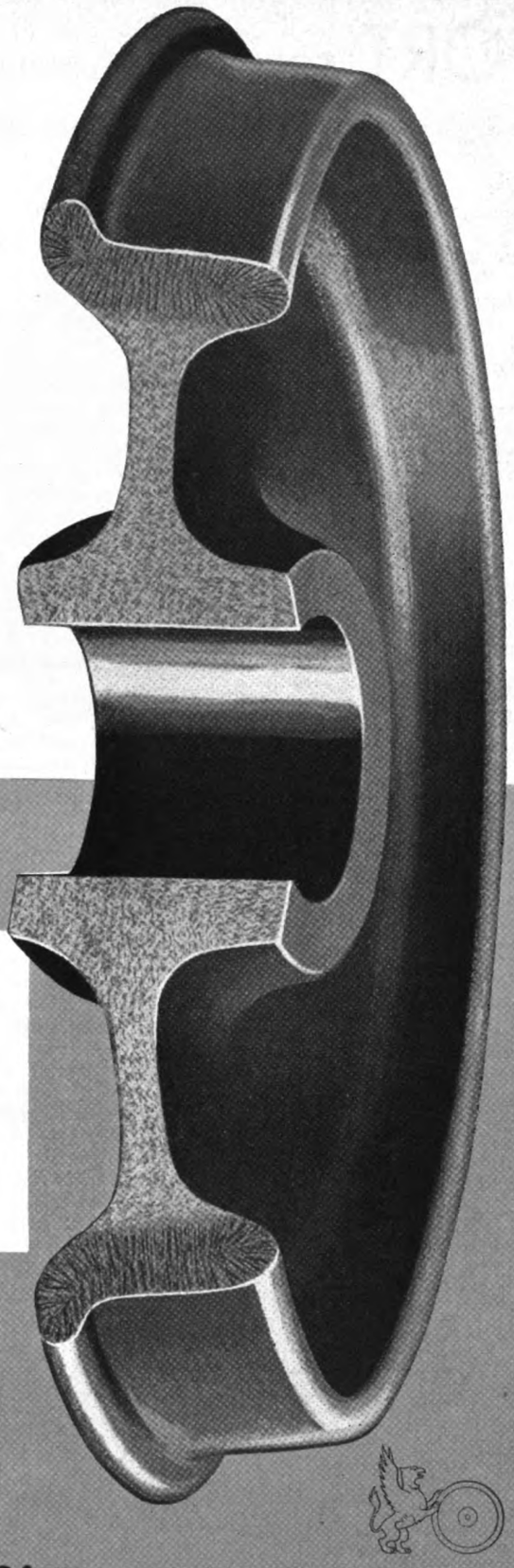

NEW DESIGN

The Griffin EQS has long, sweeping fillets under flange and rim to insure greatest possible strength. And note that the grain structure of the tread and flange is also a new "design"—at right angles to the point of wear. Result: longer life.

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Pressure pouring in graphite molds—a new concept in wheel casting—was developed by Griffin to provide a truly precision wheel. The Griffin EQS is perfectly round as-cast. Requires no machining. With fewer tape sizes, railroads can reduce wheel inventories.

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MEMBER OF RAILWAY WHEEL ASSOCIATION

REPORT FOR MAY—*Continued from page 10*

of various kinds. One member road recently reported two serious derailments caused by brake beam dropping because of missing brake hanger retainers. These derailments resulted in damage of $375,000. Additional cases were experienced where brake beams came down while being handled in trains due to improper maintenance of brake beam retaining features on the cars.

A rigid inspection by the same road at its terminals revealed many defective conditions in brake hanger parts. Photographs were taken and were attached to the circular. The AAR also was furnished a 42-page report on conditions found on a large number of freight cars in general. The report includes a large number of cases where the U-type hanger retainers had not been sufficiently spread. This could cause them to become badly worn or even missing where a bad riding truck with unfavorable wheel conditions was involved.

The AAR suggests the matter of proper maintenance be called to the attention of all concerned.

ICC Issues New Locomotive Rules

New rules and instructions for inspection and testing of locomotives other than steam will be effective January 1, 1959. The new rules were released on April 1, after hearings by the Interstate Commerce Commission. The Association of American Railroads, the American Short Line Railroad Association, individual railroads, and brotherhood representatives all presented evidence during sessions which have been conducted at various times since the original rule proposals were issued early in 1955.

The commission did not act on Rule 203 changing daily inspection practices, which is the subject of a separate case. While the new rules are effective next January, certain equipment changes are required prior to that time. By December 31, 1958, a brakepipe valve will have had to be installed at the fireman's position in all locomotive units, and air-brake systems will have had to be equipped with a device to restrict passage of oil from the compressor. Shatterproof glass is mandatory in all cab windows by the end of this year.

Other changes exciting discussion at the ICC hearings included the installation of safety hangers under spring planks, spring seats or bolsters of trucks; a ban on the welding of wheels except for the repairing of flat spots and worn flanges on switchers; the provision of a safe passageway between locomotive units with open-end platforms; and a requirement that fuel-tank cut-off valves can be reset without hazard to operating personnel.

Orders and Inquiries For New Equipment

Orders for only 70 freight cars have been placed since the closing of the April issue. The *Florida East Coast* has ordered five 50-ton bulkhead flat cars from the Thrall Car Manufacturing Company at an approximate cost of $32,500, for delivery July 1. The *Norfolk & Western* ordered 25 50-ton box cars from Pullman-Standard, for delivery in April. The *Northern Pacific* ordered 25 40-ft mechanical refrigerator cars from Pacific Car & Foundry at an approximate cost of $500,000 for August delivery. The *Arthur Equipment Company* has ordered 15 70-ton covered hopper cars from Thrall for July and August delivery.

The *Milwaukee* is inquiring for 1,000 50-ton steel box cars, each with a 7-ft plug door and an 8-ft standard door; 100 50-ton Airslide covered hopper cars, and 50 70-ton covered hopper cars. The *North American Car Corporation* will convert 50 refrigerator cars to insulated box cars. Changes will include the installation of 6-ft sliding doors to replace 4-ft swing doors, installation of steel roof and ends, and Masonite floors.

Miscellaneous Publications

TEST CODE FOR DIESEL AND BURN FUELS. 84-page "Test Code for Diesel a Burner Fuels" contains methods for the s lection of samples and the determination all physical and chemical properties for t value of liquid fuels when they are used generate heat or power. Gasoline or oth fuels used in spark ignition engines are n included, however. A brief introduction di cusses the significance of each test metho American Society of Mechanical Engineer 29 West 39th st., New York 18. Price, $

Personal Mention

Atlantic Coast Line.—*Sandford, Fla.:* F. DUNN appointed general foreman. Former general foreman at Tampa, Fla.

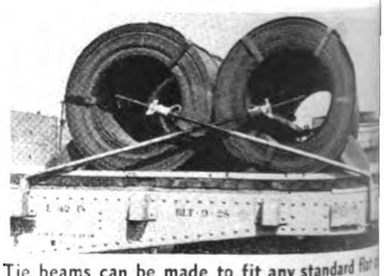
Baltimore & Ohio.—*Mt. Clare, Baltimore:* F. GEISELMAN, assistant mechanical engineer appointed mechanical engineer, succeeding *B. Lawson,* retired.

Canadian National.—*Montreal:* J. J. HARR mechanical engineer, shop methods depart ment, appointed mechanical engineer (car) system. R. S. WADDINGTON, mechanical engineer, shop methods department, appointed mechanical engineer, motive power and car equipment department. *Winnipeg:* W. J. Hall appointed assistant general superintendent of car equipment, Western Region. Formerly me chanical engineer (car) at Montreal.

Canadian Pacific.—*Montreal:* D. F. HANEY ap pointed engineer of electrical equipment an power plants, succeeding *A. E. McGruer* de ceased. GEOFFREY W. STEVENS appointed a

(*Continued on page 56B*)

Frisco standard flat takes 60 ton of coil steel. Center compartment stores tie-down equipment.



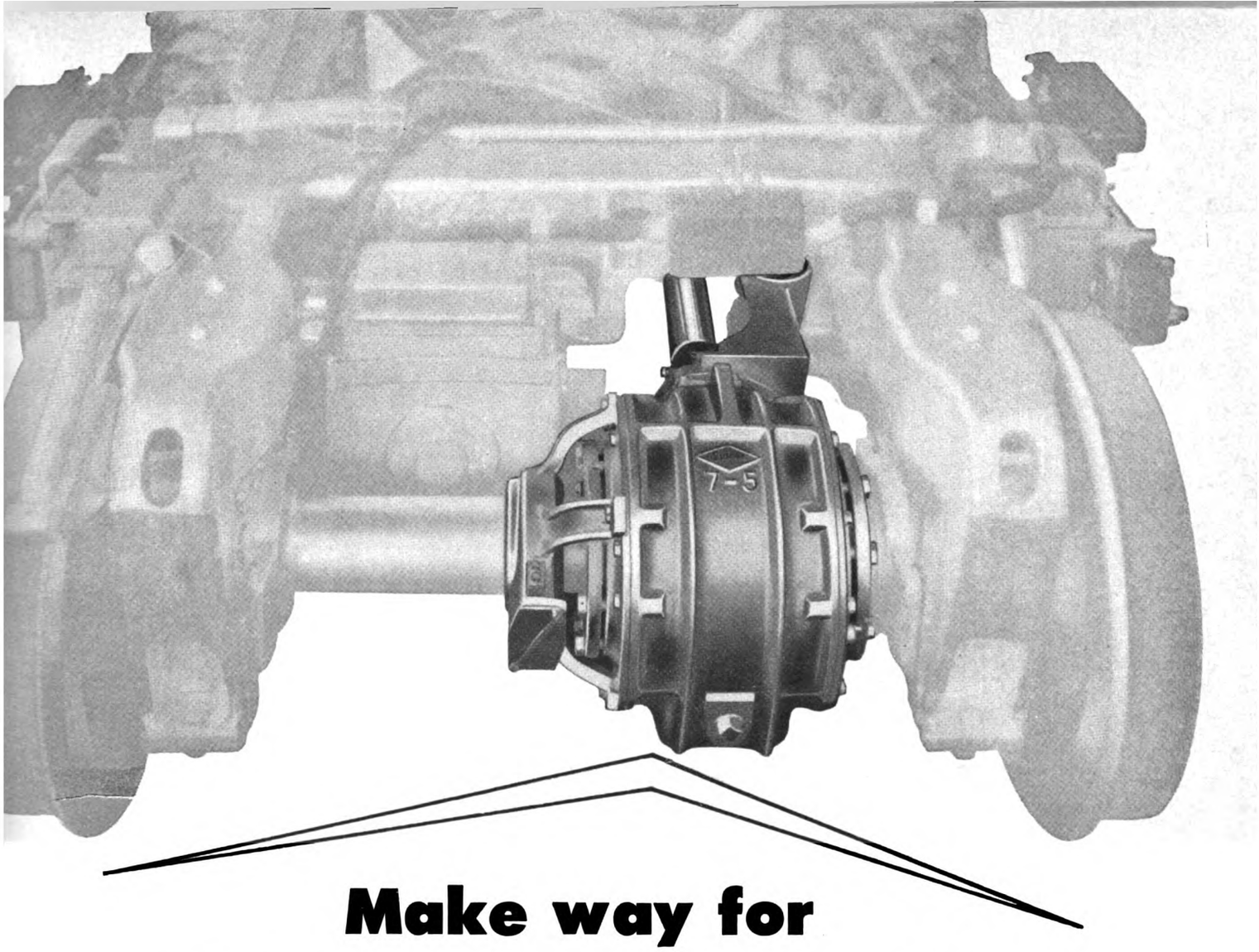
Tie beams can be made to fit any standard flat

How the Frisco Handles Coil Steel

A standard flat car, with bracing and blocking developed by the Frisco's mechanical and transportation departments, is now in service hauling coil steel shipments from the Granite City Steel Company, Granite, Ill.

The tie beams fit into regular stake pockets of the car, eliminating the necessity of having a captive or special car. Lateral braces through the coils fitted over threaded portion of beams have large tightening lugs to rapidly and easily tie the load down. These anchors, plus wood blocking at ends forming a cradle effect, permit little or no shifting during shipment. Eight coils, each weighing 15,000 lb, can be shipped on a single car. An overh crane can load the car in 28 min. Either fork lift or the crane can be used in loading.

The tie beams used in holding the co en route are returned in a center stor compartment. Cost of equipping a car t to be about $200.



Make way for Lightweight Design with Spicer Traction Motor Drives

Spicer Traction Motor Drives play an important part in reducing the cost and weight of the newest self-propelled Rapid Transit cars being produced by the Pullman-Standard Company. 50 of the new cars are already in service for the Metropolitan Transit Authority of Boston, Massachusetts.

These cars employ high-speed, lightweight motors which are coupled by Spicer high-speed propeller shafts to Spicer Traction Drives. The drive permits the application of inboard bearing trucks which provides weight and cost saving features.

The Spicer Traction Drive permits maximum acceleration through a single set of gears with optional ratios to match train schedules ranging from 5.88 to 1 up to 8.9 to 1.

To insure maximum performance, the Spicer assembly is delivered complete — ready to be secured on the axle. No further adjustments are necessary, for each set of gears has been mated, factory-adjusted and tested under actual running conditions.

If you're interested in cost and weight savings, as well as maximum efficiency from railway traction drives, write for the latest Spicer Technical Bulletin. The address is Dana Corporation, Toledo 1, Ohio.

DANA CORPORATION • Toledo 1, Ohio

DANA PRODUCTS Serve Many Fields:

AUTOMOTIVE: Transmissions, Universal Joints, Propeller Shafts, Axles, Powr-Lok Differentials, Torque Converters, Gear Boxes, Power Take-Offs, Power Take-Off Joints, Clutches, Frames, Forgings, Stampings.

INDUSTRIAL VEHICLES AND EQUIPMENT: Transmissions, Universal Joints, Propeller Shafts, Axles, Gear Boxes, Clutches, Forgings, Stampings.

AVIATION: Universal Joints, Propeller Shafts, Axles, Gears, Forgings, Stampings.

RAILROAD: Transmissions, Universal Joints, Propeller Shafts, Generator Drives, Rail Car Drives, Pressed Steel Parts, Traction Motor Drives, Forgings, Stampings.

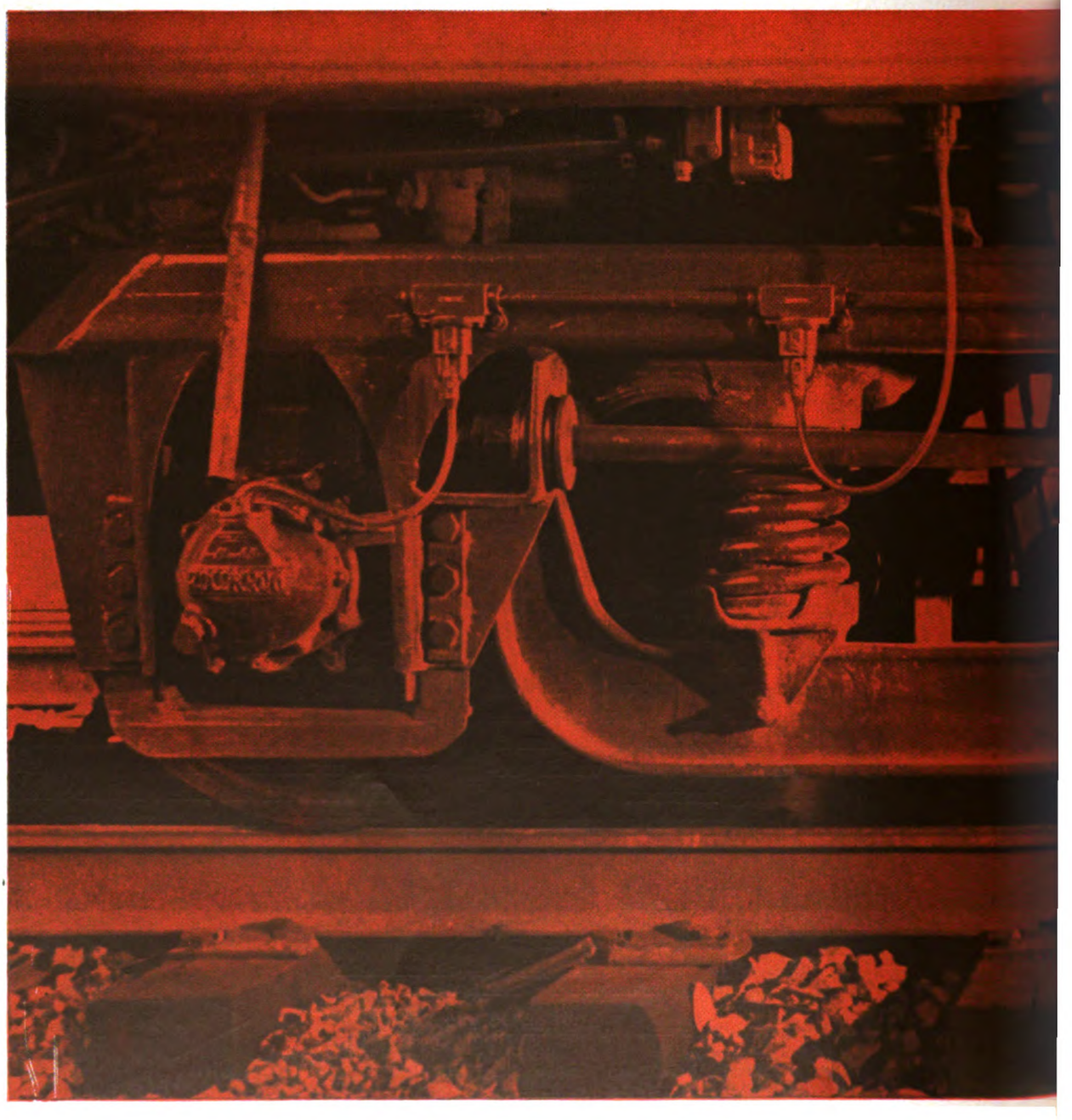
AGRICULTURE: Universal Joints, Propeller Shafts, Axles, Power Take-Offs, Power Take-Off Joints, Clutches, Forgings, Stampings.

MARINE: Universal Joints, Propeller Shafts, Gear Boxes, Forgings, Stampings.

Many of these products manufactured in Canada by Hayes Steel Products Limited, Merritton, Ontario

DANA Spicer

ANNOUNCING
NEW GULFCROWN
R.R. GREASE



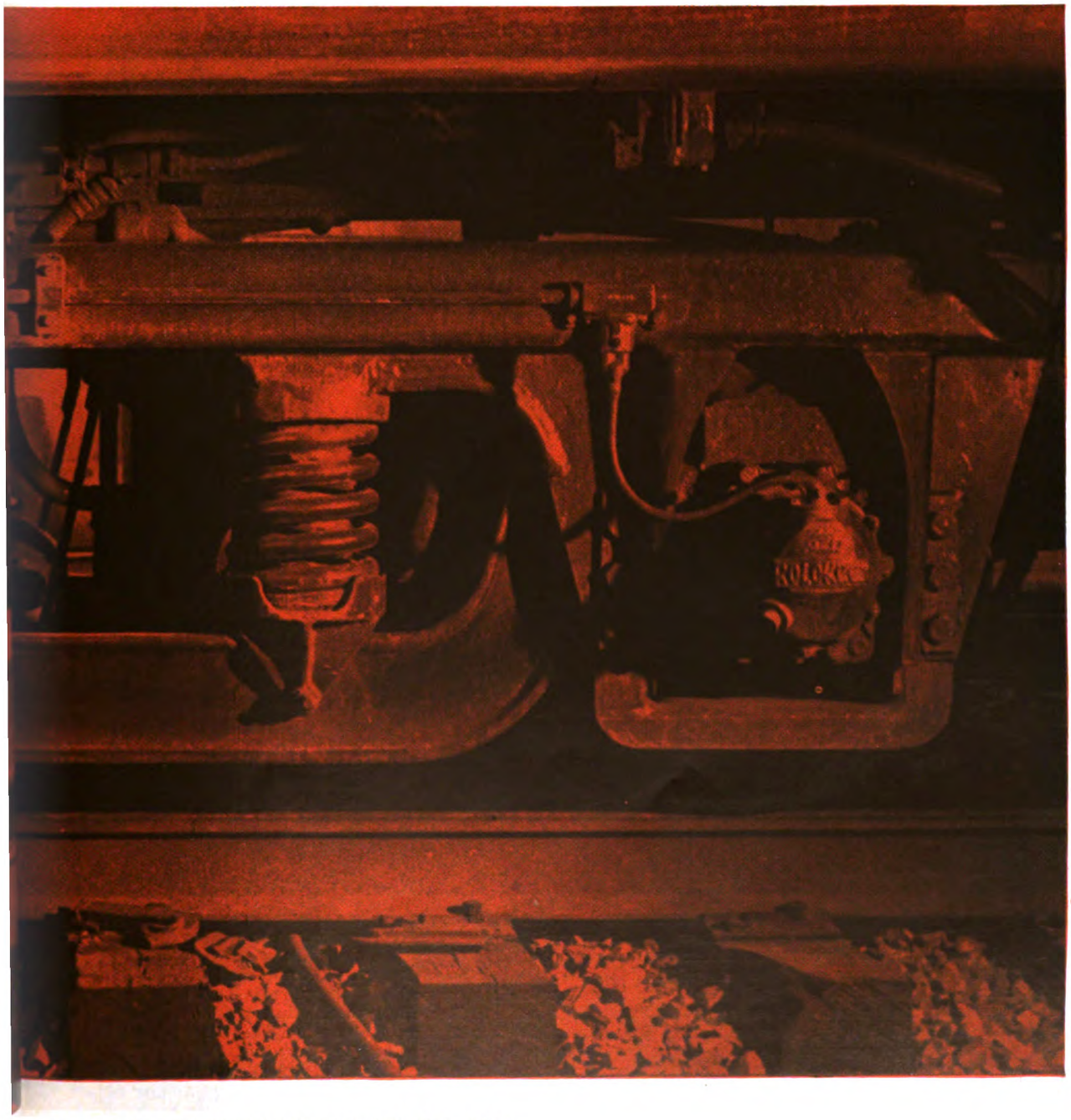
:w Gulfcrown R. R. is a lithium base grease especially veloped to provide better lubrication for railroad car ler bearing journals. It has been tested and approved ainst new A.A.R. Specification No. M-917-56—your urance that Gulfcrown R. R. grease will stand up der the toughest railroad conditions.

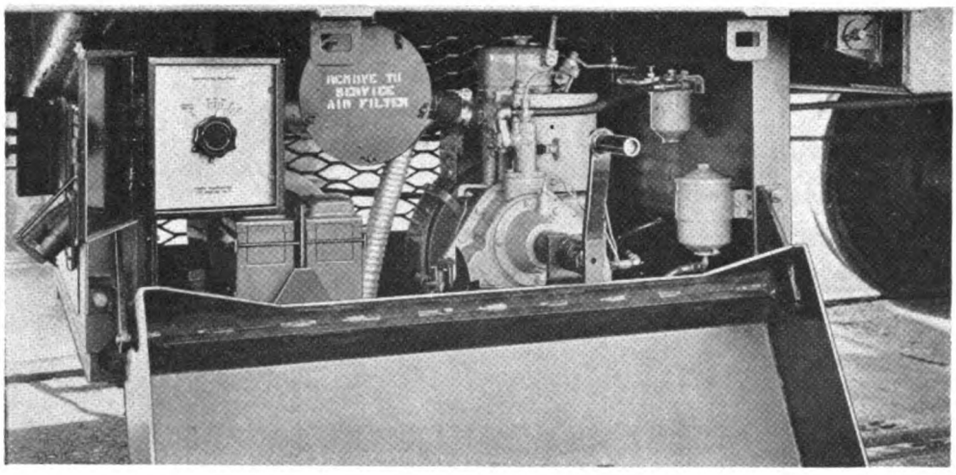
Let us have the opportunity to prove that you will get ore effective roller bearing protection—and reduced intenance costs—with this outstanding new grease. ılfcrown R. R. is available now. For further infor- ıtion, write, wire or phone your nearest Gulf office.

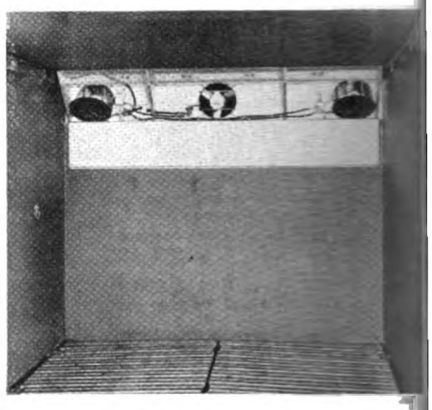
GULF

GULF OIL CORPORATION

Dept. DM, Gulf Building · Pittsburgh 30, Pa.







Automatic Temperature Control for Ice Reefers

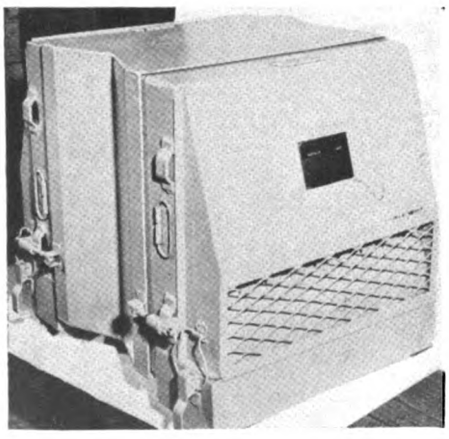
The first two ice-cooled refrigerator cars (PFE 8132 and SFRD 3494) equipped with Preco "Cargotemp" continuous-running air-circulating fans and thermostat control for any pre-set temperature between 30 and 70 deg F are in service.

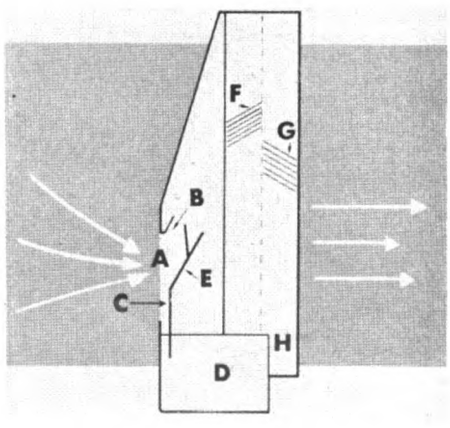
This forced-air circulating system is designed for application in any standard RS type ice-bunker car, either 40 or 50 ft. Cooling equipment consists of four electrically driven bunker fans—two in each end, thermostatically controlled and arranged to force air through the load and through the ice bunker when refrigeration is required. Dampers, controlled by the same thermostat, stop convection circulation when the thermostat setting is reached.

Two additional fans—one in each bulkhead—bypass the ice bunkers and force air through bulkhead channels to maintain uniform cargo temperature when the four ice bunker fans are in off position. These two bypass fans operate continuously at all times and have no damper control.

Electric power for the fans is supplied by a 3-hp single-cylinder air-cooled diesel engine with gravity fuel flow which drives a 220-volt, 3-phase, blower-cooled alternator. A 60-gal steel fuel tank, with convenient filler neck, dip stick, and sump, are provided.

Advantages claimed for "Cargotemp" the manufacturer include: (1) continuous forced air circulation from loading to unloading for 16 to 18 days, with air delivery equivalent to the output of wheel-driven electric fans at a sustained speed of 70 mph; (2) thermostat control for any present temperature between 30 and 70 deg; (3) fast precooling while standing or in transit to provide 100,000 Btu per hr initial heat removal from a warm load without salt; (4) full retention of all modified services—vestage icing, heaters, initial icing only, and out icing in transit; (5) full safety in case of any failure when convection circulation through ice takes over; (6) standby electric plug-in service for destination or terminal delay holding. *Preco, Inc., Dept. RLC, Los Angeles, Calif.*





Oil-Bath Air Filter

The Farr-Air Oil-Bath air filter is designed for protection of all diesel engines where intake air filter requirements make an oil bath installation desirable. Illustration (left above) shows two rectangular filters applied in an existing vertical-panel filter-holding assembly without reworking.

Unfiltered air enters through the guard screen *A* (right above) and the major portion passes through the venturi-like passage *B*. The balance of the air passes down through the passage *C*, agitating the oil in the sump *D* and carrying the oil in droplet form up and into contact with the filter media *F*. The oil control baffle *E* permits oil in droplet form to wash to the top of the media throughout the entire range of air demand. Eliminator media *G* provides for return of oil and contaminants to the return sump *H* where the dirt settles out and the oil returns to *D* for continuous recirculation.

The filter media is constantly scrubbed in a bath of oil which returns collected dirt to the sump. The only service required is periodical draining, removal of sludge, and refilling to the proper level with clean oil. This may be done without removing the filter and breaking the air seal.

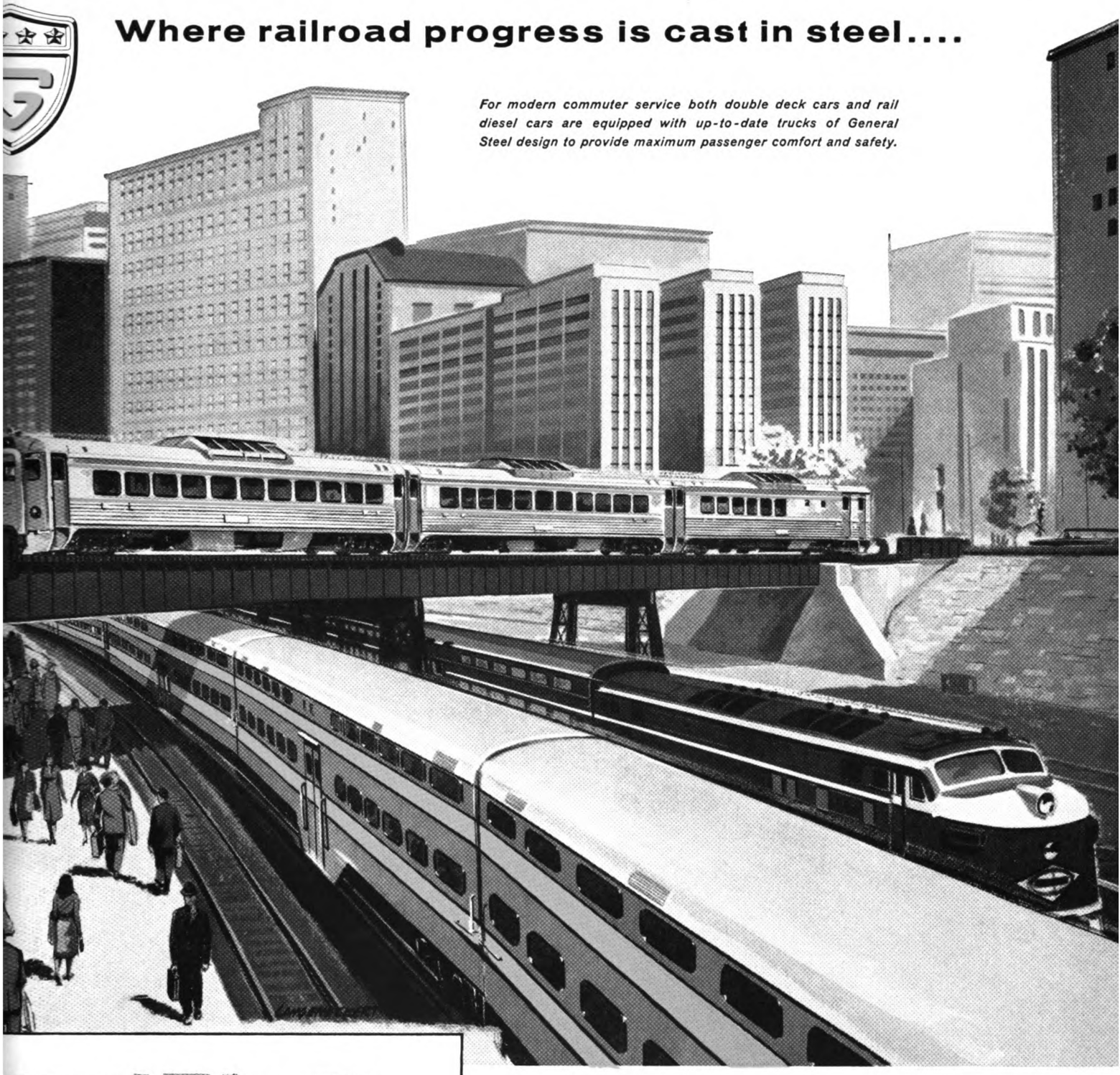
Pressure loss across this air filter is about 5 in. water gauge at rated capacity and throughout the normal operating range. Laboratory tests using standard fine dust are said to show equal or better efficiency than the original Farr 4-in. panel filter or the self-cleaning Rotonamic air filter now in general use.

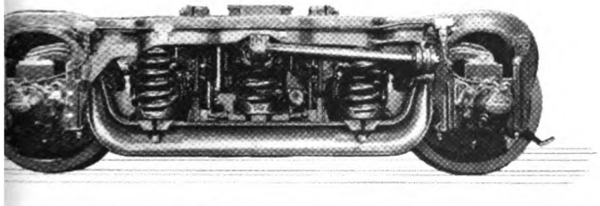
The manufacturer has recently developed Rotonamic air cleaner kits which include filters and all associated parts required for application to each type and size of locomotive made by the various builders. Instructions for ordering and installation apply equally well with the new oil-bath air filter when special dust conditions on individual roads seem to make this type of filter preferable. *Farr Company, Dept. RLC, 2301 Rosecrans st., El Segundo, Calif.*

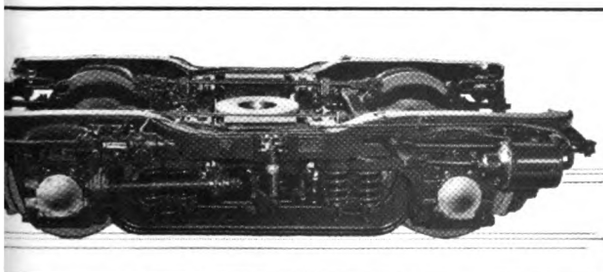
(*Turn to page 60*)

Where railroad progress is cast in steel....

For modern commuter service both double deck cars and rail diesel cars are equipped with up-to-date trucks of General Steel design to provide maximum passenger comfort and safety.







A combination of imaginative engineering and down-to-earth manufacturing know-how has enabled General Steel to make vital contributions to the growth and development of industry throughout the world. Their one-piece steel castings are the culmination of design and production skills unique with the company.

Specify General Steel products . . . they will pay you dividends through many years of maintenance-free service.

Latest design 4-wheel equalized truck for direct drive rail diesel cars assures exceptional riding comfort and safety . . . minimum upkeep cost.

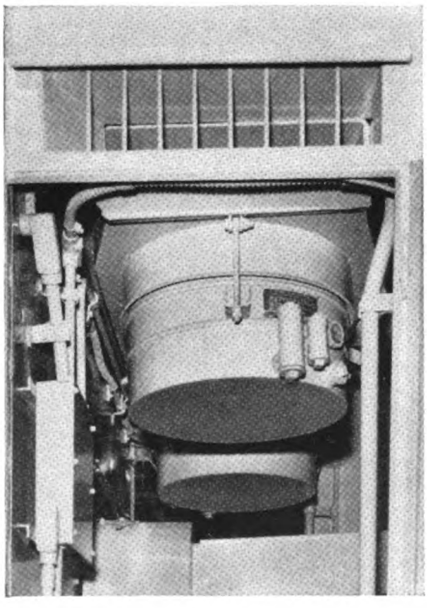
Modern 4-wheel equalized truck for double deck commuter cars. Large Central Bearing eliminates lateral shimmy and side bearing upkeep . . . increases mileage between wheel turnings and reduces operating costs.

GENERAL STEEL CASTINGS

GEARED TO PROGRESS

On these diesel-electric locomotives...

Intake air is thoroughly cleaned with AIR-MAZE oil bath filters



On these General Electric locomotives, Air-Maze oil bath filters provide clean intake air to the Cooper-Bessemer diesels.

GEARED TO PROGRESS
RPI
MEMBER

For over four years, General Electric locomotives for export service have relied on Air-Maze oil bath filters for cleaning the intake air to their efficient Cooper-Bessemer diesels. And for good reason:

Air-Maze oil bath filters maintain at least 92% efficiency* . . . even at lowest locomotive speeds. That's because their inherently high efficiency does not depend on high air velocity as do other filtering devices.

For most locomotive service requirements, maintenance is confined to simply checking oil level every month, filter oil changes at three month intervals, and cleaning a bowl once a year.

Reports from leading railroads in this country show that Air-Maze oil bath filters double . . often triple . . . power assembly life. Savings in engine and filter maintenance often pay for the cost of the filter in less than a year.

These important advantages can be applied to all locomotive diesels today. For complete data, call us or contact your locomotive builder. The Air-Maze Corporation, Cleveland 28, Ohio. Dept. RL-5

*With Standard Air Cleaner Fine test dust, 39% of which is less than 5 microns.

The biggest names in diesels are protected by Air-Maze filters.

AIR-MAZE

The Filter Engineers

ENGINE AIR FILTERS • CAR BODY FILTERS • LUBE OIL FILTERS • PASSENGER CAR FILTERS

USG® BRUSHES AY32 AND 2306 ARE THREE WAYS *BETTER*

LOW COMMUTATOR MAINTENANCE

Because of their long life and reduction of copper drag which minimizes flashovers, USG Brushes AY 32 and 2306 have proven convincingly that they reduce the maintenance cost on Diesel-Electric locomotive generators.

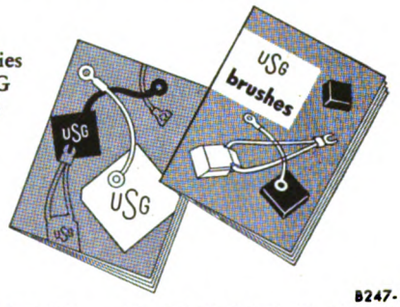
LONGER LIFE—MINIMUM WEAR

Primarily because of their purity and density, USG Brushes operate perfectly for substantially longer periods of time than the average type brush. Naturally, this means reduction in delays due to brush replacement.

PERMANENT SHUNT CONNECTION

In recent years nearly every reputable brush manufacturer has improved the anchorage of the shunt connections: none, however, are quite as firm or quite as permanent as the method employed on USG Brushes, called STATITE®. The shunt can't be jerked out and, of course, it does not jar loose.

Write for your copies of the latest USG Brush Catalog B-56 and the new USG Brush Grade Supplement.

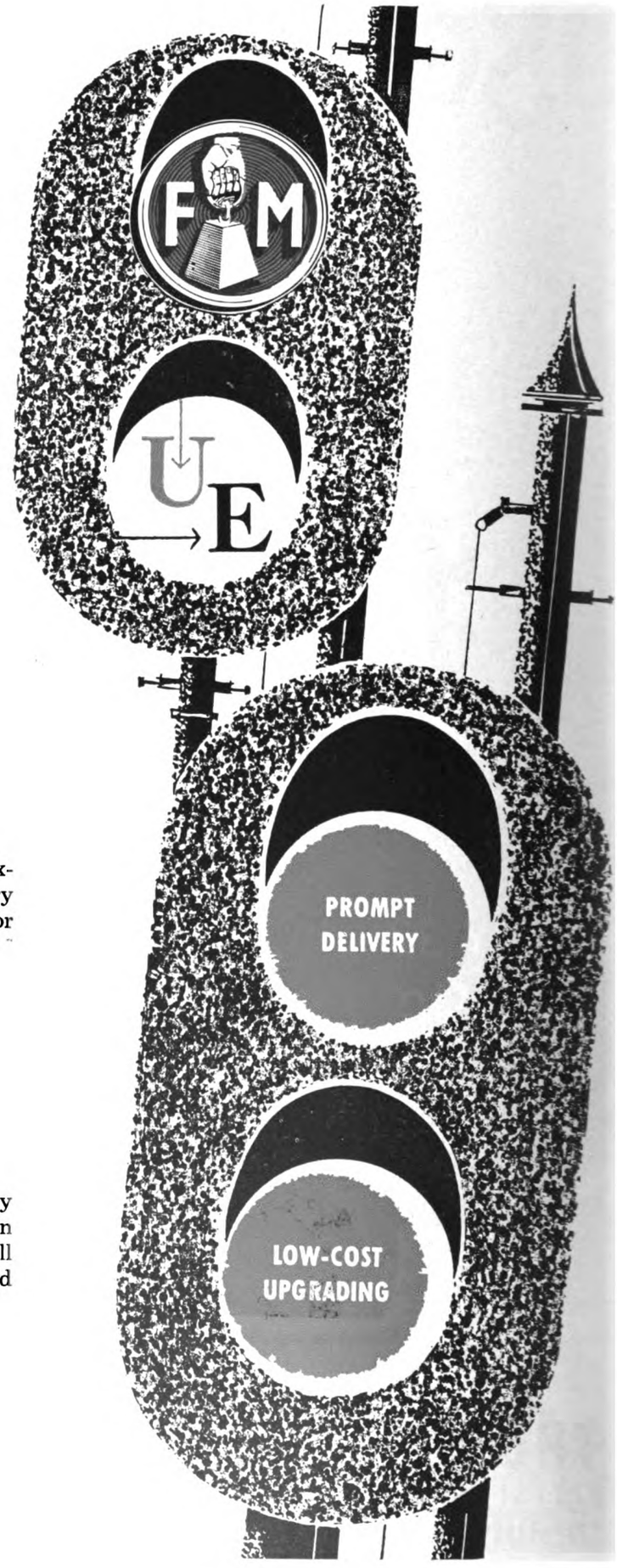


B247-1

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION, SAGINAW 13, MICHIGAN

GRAPHITAR® CARBON-GRAPHITE • GRAMIX® SINTERED METAL PARTS • MEXICAN® GRAPHITE PRODUCTS • USG® BRUSHES

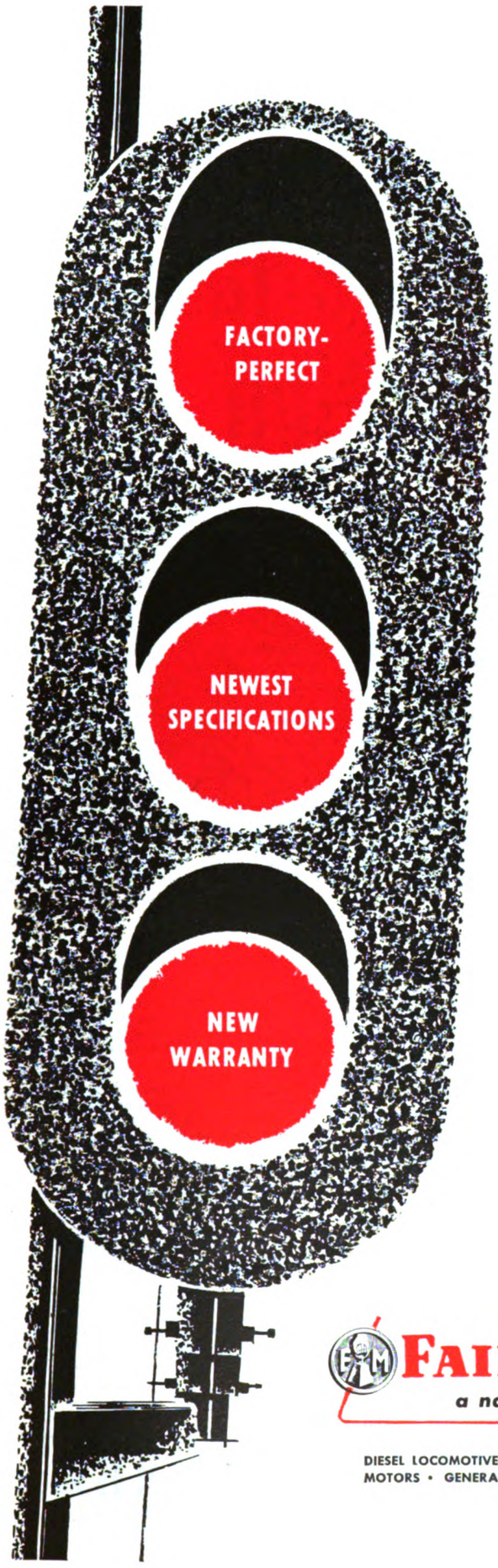


UNIT EXCHANGE

The only engine better than the O-P you have is an Opposed-Piston diesel made better by Fairbanks-Morse — available NOW through F-M Unit Exchange.

Due to a 60% increase in the F-M Unit Exchange program, there are O-P engines of every rating and major accessory group ready for prompt shipment on your order.

This F-M program enables you to effectively meet increased tonnage demands being made on your motive power fleet, yet reduces costs all along the line—lower maintenance, reduced shop facilities and lower parts inventory.



The only engine better than the O-P you now have is one "made better" by F-M craftsmen, who have the skill and techniques acquired through daily experience with only *one* engine design.

F-M's continual search for better engine performance and life can substantially improve the O-P engine and its components of five to ten years ago in many respects. Unit Exchange equipment meets the newest specifications.

Each engine, blower, pump, injection system, generator and traction motor in the F-M Unit Exchange program is warranted to give the same performance as new equipment.

For full details and delivery schedules, write: Diesel Locomotive Service Department, Fairbanks, Morse & Co., Chicago 5, Illinois.

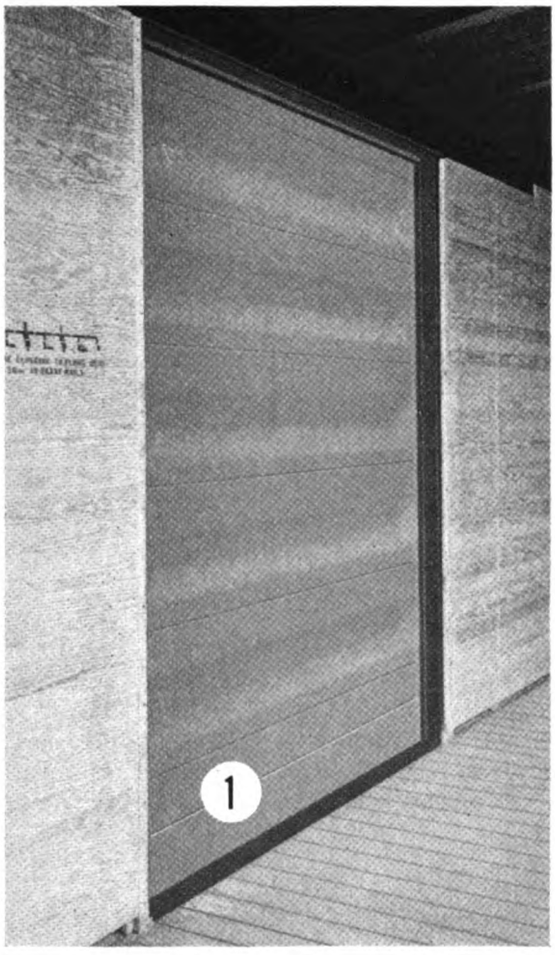
FAIRBANKS-MORSE

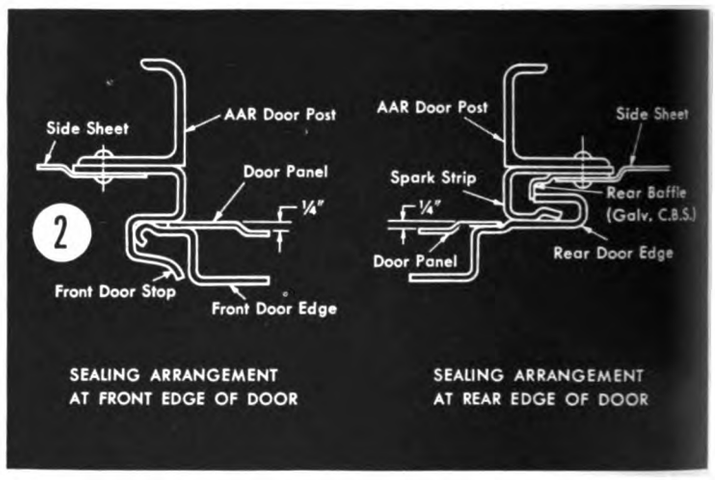
a name worth remembering when you want the BEST

DIESEL LOCOMOTIVES AND ENGINES • MOTOR CARS AND RAILROAD EQUIPMENT • ELECTRIC MOTORS • GENERATORS • PUMPS • SCALES • WATER SERVICE EQUIPMENT • HAND LAMPS

Pullman-Standard Box Car Side Doors

provide positive lading protection





SMOOTH INTERIOR PREVENTS DOOR DAMAGE TO LADING! Pullman-Standard design allows the door interior to be finished with a smooth, even surface. All framing members are on the exterior. Door fixtures are arc-welded to the outside surface. No bulges, ridges or sharp edges to cause lading damage.

SURFACE SEAL EDGES KEEP WEATHER AND DIRT OUT! The Pullman-Standard box car side door design insures a positive seal through a special baffle arrangement that brings about surface contact on all four edges of the door. Water, light and flour tests plus years of rugged on-the-road service have proved that this sealing mechanism positively shields lading from weather and dirt. Watershed top retainer and trough type door header provide additional weather protection.

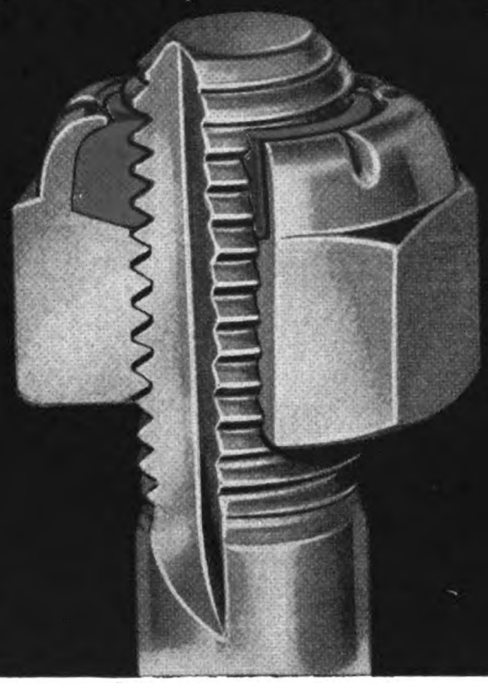
- Sizes: 9' 11" or specified height. 6', 7', 8', 9', 15' or specified width.
- Heavy-duty combination lower panel and framing member of 5/32" corrosion-resistant, copper-bearing steel to withstand loading dock abuse.
- Other panels of .10-inch corrosion-resistant copper-bearing steel. Fixtures of forged or cast steel to withstand service abuse. All parts can be repaired by welding if accident-damaged.
- 5" rollers with durable cage type roller bearings insure trouble-free, easy operation.
- All welded, precision fabricated, embossed for strength.
- Corrosion pockets eliminated by welded assembly.
- Self-protecting design and fabrication excellence provide for long life, easy maintenance.

For complete details and specifications on the P-S Box Car Side Door contact your nearest Pullman-Standard Sales Office or write to the address below.

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY • SUBSIDIARY OF PULLMAN INCORPORATED
200 S. Michigan Ave., Chicago 4, Illinois
BIRMINGHAM • PITTSBURGH • NEW YORK • SAN FRANCISCO

The nylon collared Elastic Stop® nut never damages bolt threads!



The nylon locking insert * will not seize threads, gall or remove plating

Identification at a glance is a major advantage offered by the red locking collar, an integral part of an Elastic Stop nut. Whether applied on the assembly line or re-applied by a maintenance crew, the red collar assures instant recognition as a lock nut.

Undersized in diameter in relation to standard bolt tolerances, this nylon locking insert grips the entering bolt threads with strong, smooth nylon fingers that dampen impact loads and resist turning under the most severe conditions of vibration or shock. The perfect fit between bolt threads and the locking collar also serves to seal off internal bolt and nut threads and to protect them against corrosion. Furthermore, the nylon insert is impervious to gasolines, oils, salt atmospheres, cleaning compounds and common acids. The remarkable wear resistance of nylon, plus its elastic recovery, makes Elastic Stop nuts reusable through more than a hundred on and off cycles.

Because an Elastic Stop nut is a one-piece unit, it is less expensive to install than castellated nuts and cotter pins, or double nuts. Equally important, it is a stop nut that locks at any position on the bolt without requiring secondary "safety" devices; it is simple to adjust precisely —it is easily wrenched off or readjusted.

Elastic Stop nuts are available in sizes ranging from a watchmaker's 0-80 through 3″, and in many standard finishes and materials, including carbon and stainless steels, brass, duronze and aluminum.

ELASTIC STOP NUT CORPORATION OF AMERICA

ESNA®

also maker of the ROLLPIN TRADEMARK

*The Red Locking Collar is a Registered Trademark of ESNA

Elastic Stop Nut Corporation of America
Dept. N50-528, 2330 Vauxhall Road, Union, N. J.

Pease send me the following free fastening information:

☐ ESNA Bulletin on railroad applications

☐ ESNA Cataog No. 705, Standard Elastic Stop Nuts

Name_____ Title_____

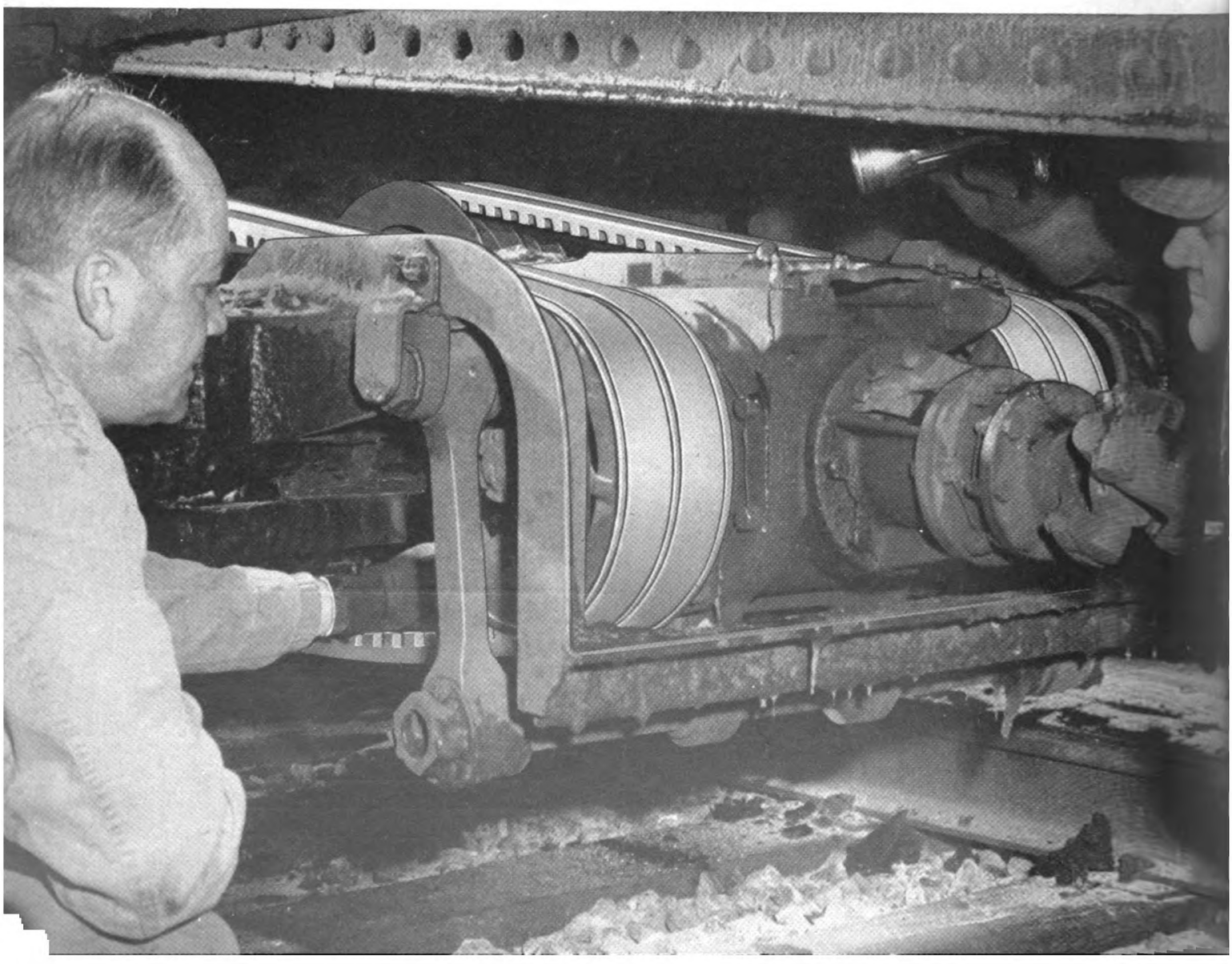
Company_____

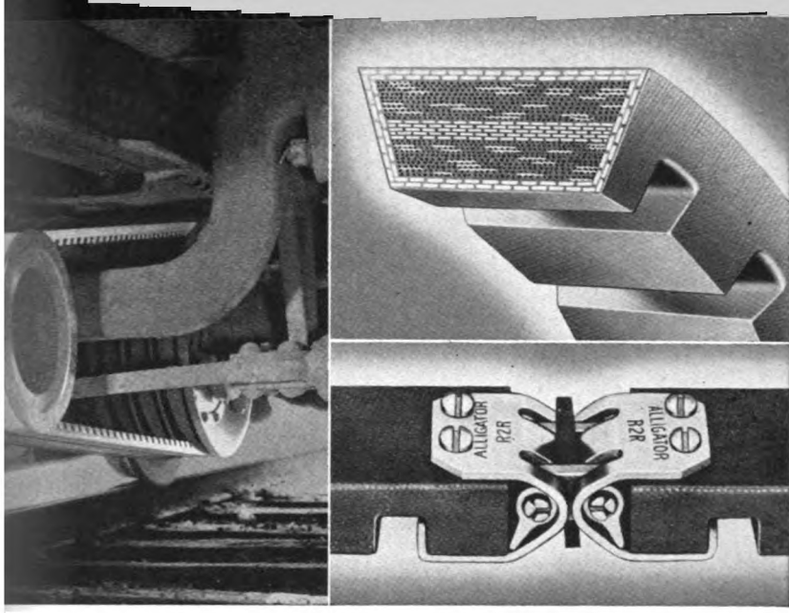
Street_____

City_____ Zone___ State_____

Dayton Railway 2" Cog-Belts are original equipment on Safety V-Belt Gear Box Drives manufactured by the Safety Car Heating and Lighting Company.

Dayton 2" Cog-Belts* Deliver





This belt is especially designed for use with connectors — highly resistant to pullouts. For convenience and economy the Dayton 2″ Cog-Belt is available in 100 foot reels.

eady Power Despite Oil, Dirt, Heat, Moisture

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**Cost based on data compiled by the Mechanical Division of the Association of American Railroads in 1955.*

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...in performance...in cost

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**

Dirt in Diesels Costs $138,733,385 Yearly

DIRT IN AND ON locomotives costs railroads $138,733,385 annually, according to J. W. Horine, electrical engineer of the Pennsylvania. This figure, an estimate, was given at the recent joint ASME—AIEE technical conference in Cleveland.

It is estimated that dirt is now responsible for approximately one-fourth of the total cost of maintaining and preparing diesel-electric locomotives for service. Slightly less than half of this can be rated as "avoidable". Mr. Horine goes on to point out that "whether or not the cost of avoiding this portion is warranted by savings would require detailed study of each individual case."

What dirt is, what bad effects it can produce, and what parts can be affected all enter into this. Dirt in diesel-electrics can be classified in three categories: Sand and roadside dirt (abrasive in nature); brake shoe dust (abrasive, conductive and magnetic); and trash (papers, leaves and rags).

Studies of costs at a well-equipped diesel shop showed that light (trip) cleaning costs $5.48 per unit and that the heavy cleaning in conjunction with monthly inspections costs $85.06 (of which $81.91 is labor). Applied on a national basis, a figure of $39,717,211 annually for cleaning was calculated.

The costs resulting from dirt entering diesel engines was evaluated on the basis of an extensive road test involving radioactive piston rings. It was found that either of two commercially-available filtering arrangements could produce a wear rate only 28.5 per cent as high as that produced by standard 2-in. impingement filters.

Over a period of almost four years, a study of material costs showed that the improved filtering could cut liner expenditures by 65.7 per cent, piston costs by 66.7 per cent, connecting rod bearing cost by 66.4 per cent, main bearing costs by 10.8 per cent, and piston ring wear by 71.5 per cent. The overall savings of 59.4 per cent resulted in a calculated saving of $865.25 per unit per year. This is further multiplied by an extension of the time between shoppings. The two figures are combined into an annual avoidable cost of $37,346,369.

Electrical Equipment

Dirt damage to electrical apparatus cannot be evaluated or even estimated with reasonable accuracy, according to Mr. Horine. The varied causes of electrical failures, lack of accurate analyses of these failures, and the small amount of cost data on repairs to electrical apparatus are all factors. The combination of dirt and moisture, rather than the presence of either one alone, is a further complication.

Some dirt damage is avoidable. Added filtration of main generator and traction motor cooling air is possible, and dustproofing of the control and power cabinets could be improved. Future units could have sealed and pressurized engine rooms with filtering of all incoming air.

Repair costs for diesel-electric locomotives are divided approximately as follows: 35 per cent for diesel engine and appurtenances, 30 per cent for electrical apparatus, and 35 per cent for all other work. Mr. Horine then concluded

(*Continued on page 36*)

What Dirt Does on Diesel Locomotives

Surface dirt:	
Exterior of carbody	Poor appearance and surface damage
Trucks and running gear	Fire hazard and wear
Tops of fuel tanks	Fire hazard
Windows and windshields	Safety hazard and crew annoyance
Carbody interiors	Fire and safety hazard
Internal dirt:	
Traction motors	Flashovers, shorts and grounds
Main generators	Flashovers, shorts and grounds
Auxiliary rotating electrical apparatus	Flashovers, shorts and grounds
Control cabinets	Malfunctioning of controls and fire hazard
Diesel engines	Excessive wear rates

Annual Cost of Diesel Dirt on US Railroads

	Unavoidable	Avoidable	Total
Cleaning	$39,717,211	———	$39,717,211
Diesel engines	———	$37,346,369	37,346,369
Electrical apparatus	———	23,564,938	23,564,938
Other apparatus	38,104,867	———	38,104,867
	77,822,078	60,911,307	138,733,385

Dirt's Place in 1956 Overall Costs

	US totals	Dirt damage Estimate	Per cent of total
Enginehouse expenses (ICC Acct 388 and 400)	$136,361,652	$39,717,211	29.1
Locomotive repairs (ICC Acct 311)	435,484,197	99,016,174	22.7
	571,845,849	138,733,385	24.3

How Much Air Filtering Can You Justify?

DIRT AND DEPOSITS in the engine and electric equipment of a diesel-electric locomotive are generally considered harmful. Filtration equipment is designed to remove as much of the dirt as possible within economic limits. However, there is a level of cleanliness beyond which it is not feasible to operate.

Electric rotating equipment requiring the most maintenance include the main generator, traction motors and the various auxiliary generators and motors. In spite of the fact that some units without filters, principally diesel switchers, operate in very dirty air on all railroads, we have few difficulties due to the abrasive effect of dirt. Inspection of motor and generator commutators on these locomotives will rarely, if ever, reveal any indication that these parts are worn because of dirt. This is no doubt due to the centrifuge effect of the rotating armature which, in part, is self-cleaning.

In this equipment there is another form of dirt which is more harmful. That is the self-generated variety. The dirt, or carbon dust, which forms from the normal wear of commutator brushes can cause considerable trouble, especially when there is a binding agent such as oil or water vapor. Carbon paths are formed across insulated areas, resulting in short and grounded circuits.

The ordinary type of dirt causes more trouble in the control circuits and power switch gear. Small particles of dust can cause trouble completely out of proportion to the size of the particle. A small particle of dirt in any one of the interlocks in the system can cause a malfunction of the locomotive. Control circuit interlocks were designed with adequate "wipe" to brush away particles and complete the necessary circuit.

In spite of this we were plagued with interruptions in service and early failure of the control and power circuit interlocks and contactors because of this wipe. Dirt particles in unfiltered air act as an abrasive and cause wear of contacts.

Air Filtration

In 1941 it was decided to equip certain locomotives with car-body filters to filter all air entering the car body. These applications were first made on freight locomotives, reducing the engine room dirt. The panel filter itself, as well as the design of the application, was subsequently improved. New panels of a non-plugging design were developed. Today, applications of this type are standard equipment on all road and road switcher-type locomotives.

Improved air quality has brought about newer designs in relays, interlocks and contactors. Some are smaller, less expensive and more trouble-free. The dust remaining in the filtered air is now of a small particle size, but it can cause trouble. We still need good wiping action and surfaces that are not prone to cinder formation. Newer interlocks and some heavy-duty contacts are silver plated or have a silver inlay.

In addition to carbody filters, there are some designs of air filters that can be applied to main generators and traction motors. The presence of a binder causing dust or dirt particles to cling to insulated parts and creepage surfaces is a problem. Attempts have been made to use the conventional 2-in. impingement filter as a dry element to stop oil, water vapors, and dirt from entering the machine. It might be more practical to reduce or eliminate the vapor from the air. Principal sources of moisture-carrying vapors in the engine room are the engine exhaust system, the steam generator and the air compressor. By maintaining these items properly, most of the moisture can be kept out of the electric equipment.

Filtration Methods

A representative diesel engine will require approximately 15,000 cfm of air during full-load operation. Carbody filters improve locomotive performance but are not without disadvantages. The principal difficulty is that a negative pressure is produced within the carbody. This means that any small hole even drain holes, will actually become a point of admission of unfiltered air.

The solution could be complete pressurization of the carbody by the use of a skimmer-type blower. Fairbanks-Morse built three such locomotives.

In time, these applications may provide many answers regarding the benefits of filtered air to electric equipment. The basic idea is good, and could be justified, not only by reduced maintenance costs, but also by better performance. The skimmer blower is a roof-mounted blower drawing in outside air through a roof opening. It is a squirrel cage-type blower that by-passes part of the air it draws into the carbody. Dust particles, being heavier, are spun to the outside of the discharge opening of the blower where they are skimmed off and discharged outside the cab. The clean air is admitted directly to the engine room. The capacity of the blower being greater than the air requirements of the locomotive enables it to slightly pressurize the carbody. There are no carbody filters or other openings by which air can enter the engine room.

A similar idea is used in the winderization hatch, furnished by EMD. This hatch utilizes existing equipment on the locomotive and can allow unfiltered air to enter the engine room. EMD has also used a "snorkle" design for export locomotives. This application provides full filtration of engine room air.

Because of the design problems and cost of application these systems are best applied to new locomotives while in production.

Main Generators

The main generator problem on the Santa Fe has been evaluated through test applications of impingement-type filters. We found minor differences in the dirt deposits between those generators equipped with filters and those not equipped. The filters were used both dry and coated with conventional plasticized filter saturant. We have never been able to detect any difference in the over-all operation. Use of filters brought two unexpected problems: small pieces of the filter would break off and mark the main generator commutator, and pieces of dirt would drop off the filter into the generator damaging brushes and and commutator. Excessive oiling of the filter could result in the saturant being pulled into the generator to collect dirt especially at higher engine-room temperatures experienced in our desert operation.

The test was terminated with the conclusion that the cost of the application could not be offset by measurable savings. Other railroads with problems, different or more severe, have found such filtration desirable.

Diesel units equipped with steam generators experience more electrical difficulties from moisture grounds. Statistics show that 45.8 per cent of the traction motor grounds or short circuits on a unit equipped with a steam generator, occur in the No. 4 traction motor directly below the steam generator. In-

An abstract of the paper "Practical Air Filtration for Diesel Locomotives," presented by M. B. Adams, general supervisor diesel engines, Atchison, Topeka & Santa Fe, at the Joint ASME-AIEE meeting in Cleveland on April 9, 1958.

:ipient steam and water leaks not only :esult in moisture draining onto the :raction motor; but, steam leaks adjacent :o the traction motor blowers are in the air stream into the fan. Steam drawn nto the motor condenses on the brush box insulating studs.

Dirt conditions in traction motors are worse than in generators because of their location. The presence of moisture aggravates the possibility of grounds. To prevent the entrance of moisture, designs are now available to extend the point of air intake to a location higher in the carbody. Steps must be taken to seal the traction motor air duct opening against water that may be found on the engine room floor.

Control Cabinet

In 1953 a "sealed cabinet" project was initiated on the Santa Fe with one of our then new F-7 locomotives. Electric cabinets were to be operated from monthly inspection to monthly inspection without being opened and inspected. The equipment included new cam switch contacts; new enclosed motor shunting contactors; new parallel relay, battery field and shunt field relays; and a new battery charging contactor. These relays and contactors, together with the power contactors, were equipped with new, enclosed, interlock assemblies.

This project ran for about three years. Several difficulties were encountered. The initial difficulty was the education of maintenance and operating people to respect the seals on the electric cabinet doors. Eventually, our maintenance force did respect the seals and quite good performance resulted. Much of the equipment to come out of this test has since become standard. We were never able to operate for extended periods without "blowing" the cabinets. It was always necessary to blow the dust out of the cabinets, clean and lubricate the reverser make the routine inspection for visible defects. In some cases it was necessary to dismantle and clean the sealed interlock assemblies. In spite of the improvements to come out of the test, we have not been able to dispense with basic electrical maintenance and periodic cleaning.

Diesel Engine

Evaluation of the cost of dirt elimination in diesel engines can be more definite. Wear of the internal parts is a direct result of dirt getting into the engine. There are some variables, such as the condition in which the lube oil is maintained and average engine temperatures. Low cooling water temperature can result in high wear rates.

The conventional 2-in. impingement-type panel has been replaced with a 4-in. panel-type element to provide better filtration and extend the change-out periods. This filter does do a better job. We have found uniform performance from the Rotonamic-type filter and are using it on nearly all new filter applications. The 4-in. filters replaced by the Rotonamic are applied to yard engines to give them better protection, and the 2-in. filters are being used in carbody filter applications.

In much Santa Fe territory from central Kansas to Texas and New Mexico, very severe dust conditions exist. We find impingement filters overloaded after only a few hours of operation. Daily changes are required, but are impossible from the standpoint of having enough clean filters and of having the locomotive available for filter changes. This results in severe dirt conditions in the engine. During severe dust storms, properly saturated impingement-type filters become dry and allow dirt to enter the engine, causing excessive ring and liner wear.

Under these conditions, we have found it beneficial and expedient to use the Rotonamic filter, a self-cleaning element using the "centrifuge" principle. It is quite efficient when handling dirt sizes above the 5 micron range. Our tests indicate that particles below this size will not contribute appreciably to engine wear.

Tests to compare engine liner wear in engines using the Rotonamic filter with those using the 4-in. impingement filter indicate that the 4-in. filter will do a good job as long as it is well maintained. Liner wear will reach approximately 0.11 in. at the point of maximum ring travel in two years of heavy freight service during which the unit travels approximately 224,450 miles. In this period the locomotive has had about 40 filter changes of 16 filters each. It has been determined that it costs about 37 cents per filter to remove, clean, re-oil, and re-apply. This cost, equated to the annual mileage of the unit, gives a filter maintenance cost of 0.105 cents per mile.

Cost Comparisons

When establishing a basis for calculation of engine maintenance cost as compared to the cost of air filtration, it must be remembered that there are many variables producing engine wear. In a damp tropical climate very little airborn dirt would be presented to the engine or the filters. In the "dust bowl" great quantities of abrasives must be filtered out. From experience with various filtration methods and tests of engine wear patterns, it seems acceptable to estimate a 50 per cent reduction in engine wear because of good air filtration. A total absence of engine air filtration would require assembly renewal in EMD engines yearly instead of every two years as is done at present. During this time, half of the liner life would be lost, piston rings would be worn out and probably exhaust valves would require replacement.

Considering the EMD 16-cylinder, 567-B engine, cost of operation without filters should increase about 0.53 cents per mile. This assumed cost is not the most satisfactory method of determining the savings from air filtration. The only way to improve upon it is to actually test the engine on unfiltered air. No one today could afford to take the risk or pay the cost. Actually, additional costs should be considered—availability, interruption in service, and increased handling charges. These are really not necessary for we are interested in tangibles only. The intangibles would only increase the already prohibitive cost of unfiltered air.

Dirt entering the engine because of poor engine-air filtration finds its way into the lubricating oil, causes wear of other engine parts and throws an increased load on the lube oil filters. Filtration of air for combustion and filtration of lubricating and fuel oil are the most important items of routine maintenance in the diesel locomotive.

In considering the cost of air filtration for the electric equipment, the yearly cost for filter maintenance of $118.40 is reduced by that portion applying to engine air filters. This results in a cost of carbody air filtration of $76.96 per year for protection of electric switch gear and the various control relays. The corresponding cost per mile for this protection is 0.0685 cents.

The direct evaluation used in the diesel engine wear versus filter cost relationship is not readily applicable to the electric system. Electrical failures due to dirt in contacts or interlocks can be quite costly. It might be necessary to send an electrician to make corrections at the point of failure. Cleaner air is sure to result in fewer road delays and fewer worn or burned parts. Even so, it is a real problem to make a direct statement as to the number of road failures that would be eliminated or the extension of life to the various parts. Current prices of contact tips and interlock fingers along with applications costs for various EMD parts total $739, broken down as follows: cam switch — $217.50; reverser —$360.00; power contactors—$114.50; and auxiliary relays—$47.00. It is difficult to establish a normal life expectancy for these parts. We can only estimate what our savings may be. Annual savings of only one tenth of the replacement cost would be attractive. It is regrettable that a more definite method of fixing costs of dirt in electric equipment is not available. It remains to be established.

What B&O Tests Showed . . .

Electrostatic Precipitator Cleans Engine Air

THE FIRST EXPERIMENTAL design and application of an electrostatic precipitator as a locomotive engine air cleaner has operated successfully in regular service for two years on the Baltimore & Ohio. Engine part wear was significantly reduced. Maintenance was not difficult and conformed to normal practices used in railroad shops. The precipitator operated without any major changes; its failures were minor and easily corrected.

All the problems are not solved. High, and in some areas excessive, air velocities through the collectors progressively reduced particle collection efficiency during the first 15 days from 98 to 93 percent. Efficiency dropped rapidly after that. Along with tests of the efficiency and operation of this electrostatic equipment, it was hoped that the precipitator with its high efficiency air cleaning ability would help answer the following:

- What is the extent of wear when all, or nearly all, road-dust abrasives are kept out of an engine and it is then subject only to so-called mechanical wear?
- How much longer will the engine operate between overhauls when airborne abrasives are eliminated?

The problems of designing an electrostatic precipitator that would meet the engine air intake requirements and fit the space available to it were solved by Westinghouse Electric and the B&O late in 1954. The installation was made in February 1955, on a 1500-hp, 16 cylinder, GM engine requiring 5,400 cfm of combustion air. Concurrent with the electrostatic precipitator test, the B&O was also testing air filters of the oil-bath, air-cyclone, and standard impingement type which provided direct comparison with the electrostatic type air cleaner (Railway Locomotives & Cars, April, 1956, p. 45).

During the first six months in field service the filter efficiency was studied and maintenance schedules were developed while the locomotive operated about 175 miles per day. The locomotive completed its two years of regular road service on the main line tracks of the mountainous Eastern Region. Two power assemblies—liners, pistons, and rings—were measured at the completion of one year's service and the balance of the assemblies were measured at the end of the two years. Some maintenance points, unfamiliar with the test equipment, were unable to make necessary repairs and the precipitator was inoperative for short periods of locomotive operation. On several occasions the test locomotive was unable to return on time to its assigned maintenance terminal for regular 15-day maintenance.

An electrostatic precipitator first charges air-borne particles and then electrostatic precipitation of the particles takes place. Dirt particles are charged by passing them through a field of unipolar ions. In general it can be said that the quantity of charge a particle received varies with the electric field strength, the concentration in the ion field and the time the particle is exposed to the field.

Particles charging is generally accomplished by two electrodes. The "passive electrode" is a surface of relatively large area such as a plate or tube. The "active" or "emitting electrode" is of relatively small area, such as a fine wire.

There are two general types of this precipitator. The first is the single stage in which both charging and precipitation are performed by a single electric field. An example of this would be a pipe with a small wire running axially through the center. Here the ac electrode is at high voltage while tube may be at ground potential.

The second type is the two-stage cipitator. Ionization and precipita are accomplished in two steps. T ionizer consists of tubes or flat pla serving ground electrodes and spac equally across the path of air flow wi small diameter wires strung betwe each pair. Some precipitation occu here.

The collector stage consists of a nu ber of flat plates equally spaced acro the air flow path orientated so dir laden air will pass between adjace plates of opposite potential, thus s ting up a precipitating field. Oil is a plied to collector plates to retain t dirt which loses its charge when preci tated.

Engine Wear Over Two Year Period
All results in inches

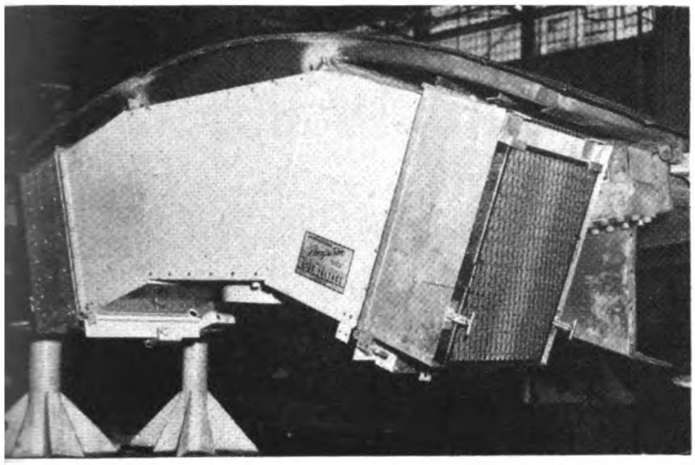
	Test Engine with Percipitron	Control Engine with Standard Air Filtration
Ring gap:		
No. 1 compression rings	0.036	0.072
No. 2 compression rings	0.021	0.047
No. 3 compression rings	0.017	0.041
No. 1 oil rings	0.025	0.082
No. 2 oil rings	0.021	0.073
Ring side wear:		
No. 1 compression rings	0.0002	0.0056
No. 2 compression rings	0.0000	0.0012
No. 3 compression rings	0.0000	0.0004
Ring groove wear:		
No. 1 compression rings	0.0027	0.0047
No. 2 compression rings	0.0011	0.0015
No. 3 compression rings	0.0008	0.0010
Cylinder liner wear:		
At 1-9/16-in. level	0.0047	0.0071
At 6-in. level	0.0034	0.0045

Locomotive Application

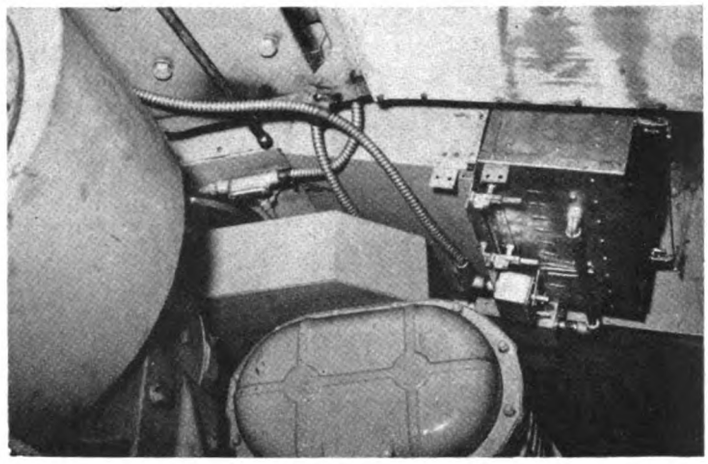
The two-stage precipitator actual used was applied to a manifold attach to the two engine intake air blowers. precipitator was attached to each en of a common plenum chamber and t whole assembly supported from t main roof hatch. A flexible duct co nected the manifold to the plenu chamber. The ionizer and collector c were constructed almost entirely aluminum. Flat plate ground electrod were used. The collector plates we supported on rods with spools to sp them uniformly apart. The plate a semblies were clamped tightly togeth to insure rigidity and good electric contact between plates of like polari The components to be removed f cleaning could not weigh over 5 pounds to allow handling by one ma Safety devices had to be provided f high voltage protection of personn The unit had to be sufficiently rugg to withstand vibration normally o curring in the engine.

Electric power was supplied to t unit by a standard 100-volt, 60-cy commercial high-voltage power pa supplying 12,800 volts dc to the ioni and 5,800 volts dc to the collector c The power pack was fitted with resili mounts for vibration protection. T power pack and a 110-volt, 60-cy 500-watt motor-generator set operat from the locomotive's 64 volt dc curr were mounted in the dynamic br hatch.

An abstract of the paper "Field Experience with Electrostatic Precipitator on Diesel Locomotive Engine Air Intake," presented by P. Kanaas and W. C. Kern of the Baltimore & Ohio, and E. L. Richardson of the Westinghouse Electric Corporation, at the Joint ASME-AIEE Meeting in Cleveland on April 9, 1958.



ecipitators were supported from the dynamic brake roof hatch and fed a ımmon plenum chamber from which both engine blowers took their air.



Impingement filters on Precipitron air intakes kept papers out of the device. Having concluded tests, Baltimore & Ohio has now removed all this equipment.

recipitron Maintenance

Maintenance of the electrostatic pre-pitator was relatively simple because vo complete sets of collector cells and ınizers were used. One set was in serv-e while the dirty set was held in the ıop for cleaning and treatment. The me required for two men to change ut the electrostatic precipitator parts as about twenty minutes. The parts ere not too large for one man to andle but it was safer when two men erformed this work.

Cleaning of the dirty ionizer and col-ctor cells was done either with a steam t gun using a soap solution designated r cleaning aluminum parts or by dip-ing them in wash tank and then rins-ıg clean with water. When dry, the ollector cells were dipped in a filter eating compound to insure that dirt articles would stick to the collector cell lates.

No trouble was reported during the st period due to blow off dirt caused y vibration or electrical arc-over be-veen the collector plates.

Two surge limiting resistors in the ower pack failed and had to be re-laced. Failure of these resistors was ot believed to be due to vibration or eat.

Two troubles were reported with nizer insulators. Some were broken pparently by dropping the ionizer or y malfunctioning of the cable connec-r. Corrosion products around the in-ılator caused short circuits. Insulators f a more suitable design were installed. During the test several ionizer wires roke and were replaced.

Bearing failure on the dc motor of ıe motor generator supplying power to ıe precipitator power pack resulted in ıe precipitator being inoperative for 5 days.

It was reported at the shop that the precipitator required frequent maintenance of a minor character. On several occasions the precipitators failed to function on reassembly after cleaning and had to be taken down. The frequency of this decreased with experience. It was also reported that on ten occasions the locomotive returned to the shop with precipitators not operating. Four of these were due to the motor generator set, and the others could not be identified.

Precipitator Efficiency

The tests indicate that with oil-treated collector plates the efficiency by count ranged from the initial efficiency of 98 per cent to about 93 per cent when the collectors had been in service 15 days and after 30 days the efficiency had decreased to about 40 per cent. This drop in efficiency made it necessary to change out the collector cells and ionizers every 15 days in order to maintain a high efficiency. This matched the semi-monthly inspections of engines.

Test runs made with untreated or dry collector plates showed no significant difference in efficiency with those that were coated with a tacky oil. The deposits on the collector plates in both cases were similar in appearance and subsequent analysis showed them to have coatings composed of airborne dirt, carbonaceous material and over 50 per cent by weight of oil. It was evident that the electrostatic precipitator was collecting the oily vapors of the diesel engine room.

The two-year wear data for the test engine are compared with wear data derived from the control engine equipped with the standard 4-in. panel filters.

The average cylinder liner wear shows a reduction of 34 per cent at the 1-9/16-in. level and 25 per cent at the 6-in. level. In terms of out-of-round wear, only two test engine cylinder bores were found to exceed the limit of .005" compared to 12 from the control engine.

Compression ring wear, measured as gap increase, showed an average reduction of approximately 54 per cent for the test engine. Oil ring wear was reduced in the test engine by as much as 70 per cent.

Most maintenance problems encountered during the testing of the electrostatic precipitator could undoubtedly be eliminated by improvement in materials and design. A prime objective for any future design would be to extend the high degree of efficiency obtained during the initial 15-day period to a service period lasting 30 days.

A good indication of the air cleaning efficiency of the electrostatic precipitator was apparent when an inspection of the plenum chamber showed no dirt deposits after going uncleaned during the entire two-year test.

Dirt deposits on the collector plates, as well as on the ionizer plates, adhered tenaciously to the surfaces. Evidently the precipitator collected all airborne particles including oily and carbonaceous components of the railroad atmosphere. Such deposits could not be removed by pounding or vibrating plates.

The test engine parts were examined visually and found exceptionally clean in comparison to control engine parts. The rate of engine deposits, therefore, seemed to correlate with parts wear. It was generally agreed that the test engine could have continued to operate efficiently well beyond the normal two-year overhaul period based on the wear rates experienced.

Look at Your Locomotive Fleet . . .

How Much Cleaning Can You Afford To Do?

PROBLEM:

To obtain a direct return from every dollar invested in cleaning.

SOLUTION:

Take a realistic view of cleaning and adjust schedule to actual need.

Balance These Advantages and Disadvantages:

Advantages:

1. Improved reliability. Clean equipment is subject to fewer failures than dirty equipment. This means improved transportation efficiency.
2. Improved safety. Clean locomotives are easier to inspect, less susceptible to fire, and safer for operating personnel.
3. Improved economy of operation. If cleaning is properly performed, overall maintenance costs should be minimized.

Disadvantages:

1. Cost. Cleaning is, to a large extent, a manual operation. It can become a relatively large item in the maintenance budget.
2. Out-of-service time. Locomotives being cleaned are generally unavailable for either maintenance work or for use.
3. Intangibility of benefits. It is seldom possible to determine exactly what return is obtained on money invested in cleaning.

CLEANING can be the most valuable investment a railroad makes—or the most useless. The secret of economical cleaning is to perform only the necessary cleaning, at the proper location, and at the right time.

The impression has grown that cleaning has ceased to be a maintenance item and has progressed to the state of an art. Seldom has there been an attempt made to view the subject in its proper perspective. Cleaning is an important, but frequently exaggerated phase of preventive maintenance. There is much more to it than cleaning alone.

Incredible as it may seem in this day of precise measurements, there is no absolute standard by which to determine cleanliness. In practice, the term can be used only in a comparative sense. For instance, a house is "clean" in comparison with other houses; a machine shop is "clean" in comparison with other machine shops. A "dirty" house might be "clean" in comparison with a clean machine shop. To make a machine shop as clean as the house would involve prohibitive expense and serve no good purpose.

This principle applies equally well in the case of locomotives. It may prove interesting and valuable to examine current practices in this light. Railroads may have developed their own ideas of what constitutes a clean or dirty locomotive; a clean or dirty engine room; or a clean or dirty high-voltage cabinet. Practical considerations might show need for changes in present practices that would improve performance and reduce costs. The balance must be struck between the danger of high costs resulting from unnecessary cleaning and that of high costs for the repair of damage caused by neglect of proper cleaning.

To a great extent, cleaning is simply the removal of foreign material which might have been kept out of the equipment in the first place. Failure to evaluate conditions surrounding locomotive operation and the type of locomotive has led many railroads to do too much or too little cleaning. These can be avoided only by studying individual cases.

A certain amount of cleaning is absolutely necessary. ICC rules require that decks be kept clean of oil and dirt and that hazardous oil accumulations be removed. Depending upon the local inspector, these rules may cover many or only a few items. Safety demands a minimum standard of cleanliness for running gear to permit rapid, accurate inspection for broken or worn parts.

Inspection of locomotives belonging to various railroads indicates that there is seldom agreement on the amount of cleaning required, but it is evident that as labor costs continue to rise, less and less cleaning is being done.

Economics of Cleaning

Cleanliness in a locomotive can be measured in actual dollars. The laborer who performs most of the heavy cleaning receives an hourly basic wage of $1.96. Overhead and benefits bring his hourly cost to the company to over $2.50. A mechanic who performs engine repairs, inspection, and specialized cleaning costs about $3.15 an hour, including overhead.

In a typical freight locomotive pool a unit returns to its home terminal six times during a 30-day period. Exterior cleaning, wiping up oil leaks, changing car-body filters, mopping the cab, and similar labor will require a minimum of five man-hours on each layover. This means $75 monthly for a minimum of home terminal cleaning. A railroad with 100 freight units would spend $7,500 monthly for labor to wipe up dirt and oil!

Cleaning is constantly repeated, and the cost can quickly become excessive. This is especially true if cleaning is substituted for maintenance. The $75 minimum monthly expenditure can quickly jump to $300 if oil leaks are ignored and intermediate terminals must continually wipe oil off the engine room deck to comply with ICC requirements. Money consumed here by excess cleaning costs would be better invested in engine repairs.

Consider what would happen if more thorough cleaning were required. If this consumes six hours instead of five, the cleaning bill for 100 units will be increased to $9,000 monthly. The additional cleaning must produce a return that will offset the extra $1,500 costs.

At a location maintaining 100 units per month, it is entirely possible that supervision is spread so thin that a 5-hour cleaning job requires 6 hours

An abstract of the paper, "Practical and Economic Limitations of Cleaning Operations on Diesel-Electric Locomotives," by D. H. Noble, Chicago, Rock Island & Pacific, and B. L. Judy, General Electric Company, at the Joint ASME-AIEE Railroad Conference in Cleveland, Ohio, on April 9-10, 1958.

An additional foreman at $600 per month would more than justify his salary if he could reduce cleaning time by one hour per unit. This is a point too often ignored during maintenance force reductions.

The mechanic, a higher paid specialist than the laborer, must also do some cleaning. Electricians must keep motors, generators and controls clean to insure dependable operation. Much of a mechanic's cleaning is associated with inspection, testing and repair work. It is difficult to segregate actual cleaning time. An hour of mechanic's time spent cleaning carbon dust off a traction motor string band might prevent a flashover and save a $1,000 armature rewind; but to clean the same dust off the motor exterior would be a waste of time.

The type and location of dirt is one key to the necessity of cleaning. A little dirt under a connecting rod bearing can mean the cost of a new crankshaft. The same dirt on the outside of the engine would be utterly harmless. A grain of sand on an interlock contact may result in a road detention, while the same grain in the bottom of the high-voltage cabinet could not even be seen. In locomotives it is not cleanliness, but cleanliness in the right places, that pays off.

Too little, or poorly directed, cleaning will increase equipment failures. More of the maintenance budget will be syphoned into repairs and trouble shooting; less will be available for useful preventive maintenance. Too much cleaning can quickly devour an equally large share of the maintenance budget.

Fundamentals of Cleaning

Though cleaning may not, of itself, be maintenance, it can prevent a large amount of maintenance. Dirt, grease and oil fumes are enemies of electric and mechanical equipment. When kept clean, a large percentage of failures will be avoided. The benefits of cleaning mechanical equipment are rather difficult to evaluate. Beyond the minimum required by ICC rules and safety considerations, this area is open to question. Wear of parts is affected by dirt. The psychological effect of clean equipment is intangible; but a good mechanic tends to do a better job on clean equipment. While no dollar value can be placed on this, it is a compelling reason for keeping locomotives as clean as practicable.

Engine Room

Vital parts of the diesel engine are well protected from dirt. Dirt is most likely to find its way to them in the air, fuel and lubricating oil. It is difficult to correlate engine room dirt to engine wear. It stands to reason that engine room dirt will eventually reach either wear surfaces in the engine or the electric equipment. Even such a simple task as refilling the governor invites failure when the engine room is so grimy that dirt is carried into delicate parts. This is clearly evident from the large number of hunting governors found on dirty engines.

Engine room dirt is oily—particularly bad for electric equipment. Excessive blow-by in the engine will frequently result in an oil-soaked generator. In certain locomotives, this may only be cleaned by removing the generator, and a simple cleaning job becomes a major project. Small air piping leaks can blast oil into locations where it will do a great deal of harm. Any means of eliminating oil vapors will make cleaning simpler.

Electrical Equipment

The most immediate return from a suitable cleaning program is found in the electric apparatus. Flashovers, grounds and similar failures are directly related to dirt. Dust usually found around railroads is a good conductor of electricity. If it accumulates on insulation creepage surfaces, it will cause failure. Periodic cleaning of insulation surfaces on motors and generators is good preventive maintenance. Keep as much dirt as possible out of the machines by maintaining filters in good condition and do a thorough job of getting rid of the dirt that does enter.

When the dirt is oily, no amount of blowing will remove it. It must be washed away with solvent. When possible, it is preferable to wipe the equipment with a cloth dampened with solvent, rather than to spray or wash it. The most difficult type of dirt to remove is the smoke-like deposit of fine carbon. It cannot be blown or washed off. The only way to get rid of it is by scrubbing. In inaccessible places, this is best done by an abrasive blast.

There is a strong temptation to paint insulation instead of cleaning it. This is the worst possible mistake. The layer of conducting dirt is still under the paint, and the current breaks through just the same. The difference is that now the dirt cannot be removed by cleaning because it is protected by the paint.

Control Cabinet

Most of the control equipment is located in the high voltage cabinet and is fairly well protected. Occasional judicious cleaning may be required, but misdirected or over-cleaning can do great harm. Air-operated, heavy-duty power contactors have components capable of carrying large currents, along with interlocks which perform secondary functions in the control circuit. These are small and capable of carrying only light currents. The design and size of the power contactors means they are little affected by ordinary dirt unless it is highly conductive. Most interlocks are designed so that their contacts are vertical, shielded, or enclosed. Only clinging dirt—such as oil-soaked dust—will cause trouble in open interlocks. Normally, very little oil should find its way into the cabinet, so very little cleaning of the contactors should be required.

A careless worker with an over-active oil can may create a real cleaning problem. If excessive oil is added to contactor air cylinders, it will be blown out through the exhaust ports of the magnet valves as a fine spray that settles on all nearby equipment. Cleaning contactors in this condition is impossible without removing them from the compartment.

Careless cleaning of the contactors can cause trouble. If they are washed with cleaning fluid, dirt will be carried into crevices in the insulation where it may cause a breakdown. The cleaning fluid may get into the air cylinder where it will ruin the lubricant, attack packing, or corrode metal surfaces. This would result in a sluggish or inoperative contactor. Careless movements can be responsible for trouble. A coat sleeve caught in an interlock can bend it, causing faulty operation.

As far as contactors are concerned, it appears that no cleaning at all would be better than incorrect cleaning. An occasional blowdown with low-pressure air should suffice. In areas where sand storms are encountered, more frequent blowdown will be necessary to prevent the accumulation from interfering with the mechanical operation of the equipment. Under certain circumstances, vacuum cleaning may be necessary but it is more expensive and less practical.

Reversers and cam switches are much like the power contactors and require little or no cleaning. Their main contacts will bear watching. When the device operates, contacts have some sliding motion which tends to drag oily dirt along and deposit it at the end of the contact travel where it tends to build up and dry. If the finger rides up on this deposit, the resultant arcing will burn the contact surfaces.

Oily dirt can cause trouble on the insulation surfaces of these devices where it may cause a ground or creepage failure. Surfaces can be wiped with a cloth soaked in an oil solvent when it is necessary to remove the dirt. The real solution is to avoid over-lubrication. The various relays—enclosed, shielded and open—are much like interlocks. Cleaning can do little for them, and careless

(Continued on next page)

cleaning can do much harm. Resistors, rectifiers, transformers and capacitors are so built that dirt has little effect on them, and cannot prevent their working. Large buildups of dirt could possibly cause some overheating. An occasional blowdown with low-pressure air is all that is required.

There is the temptation to paint instead of clean. Paint may inadvertently get onto the contact surfaces of the equipment. Worse than a brush is a paint spray. The fog of fine droplets it produces can settle on contacts of relays and interlocks, causing intermittent failures which are nearly impossible to find. The temptation to repaint the high-voltage cabinet simply to dress it up should be resisted.

Shop Schedules

Many cleaning and painting operations can be safely performed during general repairs that cannot or should not be done at other times. Removal of the main generator permits thorough cleaning and painting of the generator pit, and revision of drainage to prevent future oil accumulations. Wiring in locations where oil and moisture are excessive can be replaced with neoprene-jacketed cable. Delicate relays can be relocated where they will be better protected. On one design of locomotive, moving the engine temperature controls from the front hood to the electric cabinet eliminated failures of this equipment caused by dirt, oil, and moisture.

Anything that can be done during shopping to reduce the possibility of oil leaks will reduce future cleaning costs. Frequently, slight changes in materials or methods will prevent such failures. Oil lines which are especially subject to breakage may be relocated so that a rupture will not pour oil on electric equipment, or in a location where it cannot be readily wiped up. On one group of locomotives, a small oil line originally passed directly above the front traction motor blower. Fatigue failure of the tubing would result in several gallons of lube oil saturating the traction motor before the leak was discovered. A simple rerouting of this line immediately ended a costly series of traction motor failures.

Painting is safe while equipment is out for reconditioning. A fresh coat of gloss paint will not only improve engine room appearance, but give a smooth surface upon which dirt cannot easily adhere.

Every effort should be made to [illegible] the backshop turn out a locomotive [illegible] will run with a minimum of engineh [illegible] attention until the next shopping is [illegible] It is uneconomical to outshop a locc [illegible] tive with a new generator coupled t [illegible] engine badly in need of resealing.

Shop modifications can be made [illegible] will permit more effective cleaning me [illegible] ods. Neoprene wiring, proper selec [illegible] of conduit and junction boxes. [illegible] minor changes in electric cabinets [illegible] frequently permit spray cleaning of [illegible] engine room without danger to elect [illegible] equipment. If Woodward governor c [illegible] nections are made with neoprene-coat [illegible] flexible conduit and watertight fittin [illegible] the front of the diesel engine can saf [illegible] be sprayed, and many dirt pockets n [illegible] readily accessible to hand wiping can [illegible] reached.

Obviously, sound economic poli [illegible] dictates consideration of means of re [illegible] ducing the need for cleaning. The pr [illegible] mary consideration is not the frequen [illegible] or extent of cleaning, but rather the re [illegible] sults accomplished. Too much clean [illegible] or incorrect cleaning is uneconom [illegible] and can cause new troubles. Too lit [illegible] cleaning may result in sharply increase [illegible] maintenance expense.

Diesel Dirt Costs $138 Million

(*Continued from page 29*)

that the diverse causes of electrical faults would probably make dirt damage of only half as much importance there as on diesel engines. Finally, cleaner electrical equipment would not extend the periods between locomotive overhauls because diesel engine condition controls this. These factors were combined to produce a dirt cost on electrical apparatus of $23,364,938.

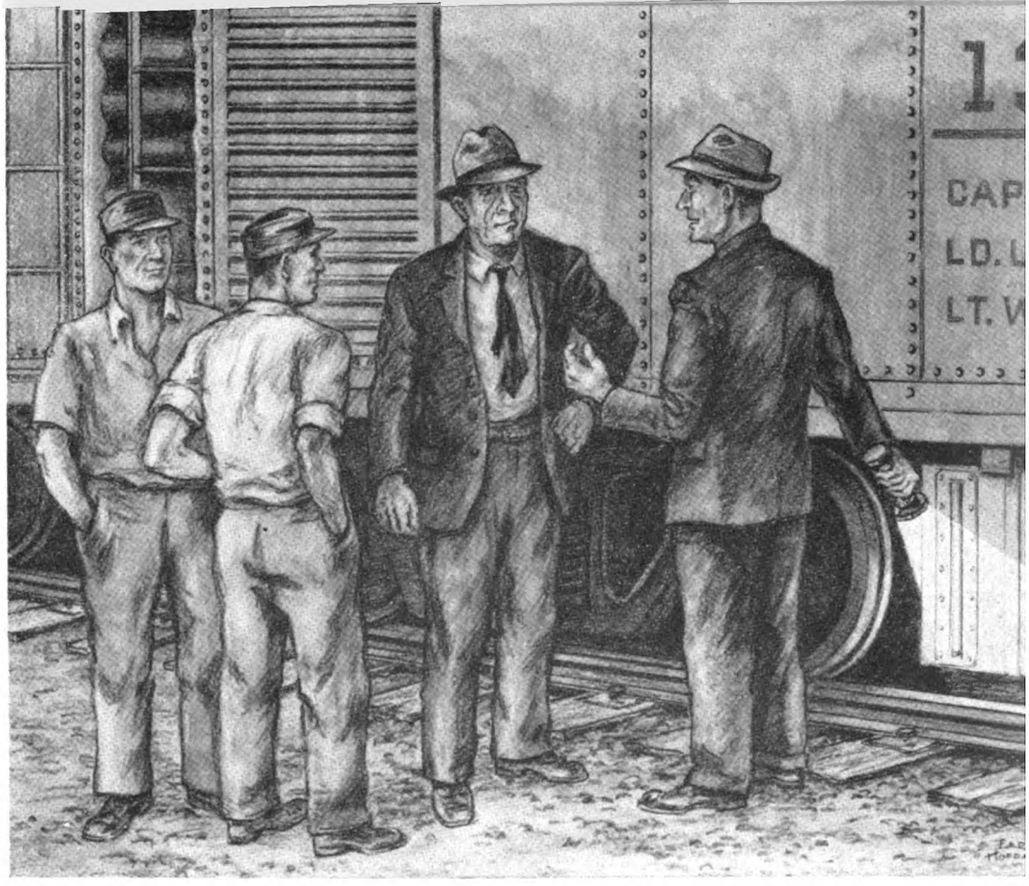
Other losses which individually are small, mount up rapidly, when added together. These include such things [illegible] poorer heat transfer in dirty radiator [illegible] damage to carbody exterior finish, [illegible] damage and wear between moving sur [illegible] faces. All of this is bulked under "dir [illegible] on other portions" and was estimated t [illegible] amount to $38,104,867 annually.

FAULT \ CAUSE	Dirt and/or moisture	Excessive gear wear	Broken Brushes	Improper grade of brush	Improper workmanship	Age or Wear	Improper lubrication	Bearing Failure	Poor design	Overloading unit	Slipping wheels or overspeed	Brake shoe sparks	Loose Pinion	Malfunctioning of control
Armature winding shorted or grounded	●	●			●	●				●				●
" " to be replaced	●	●			●	●		●		●	●		●	●
" bands damaged	●				●	●		●			●		●	
Commutator flashed	●	●	●	●	●				●	●	●		●	●
Commutator grooved			●	●	●	●		●	●	●				
Commutator loose					●	●		●	●		●		●	
Commutator to be renewed			●	●	●	●		●	●	●	●		●	●
Broken brushes	●	●		●				●			●		●	●
Brushholders elect. damaged	●	●	●	●	●			●			●		●	●
Brushholders Mech. damaged					●			●						
Field coils shorted	●	●			●	●		●		●				
Field coils grounded	●	●			●	●		●	●	●				
Field coils roasted					●	●			●	●				●
Field coils loose on pole		●			●			●	●					
Armature bearing damaged	●	●			●	●	●				●			
Loose pinion		●			●	●	●				●			●
Motor support excessive play		●			●	●		●						
Burnt wires and cables	●				●	●			●	●		●		●
Control and power grounds	●				●	●			●	●				
Malfunctioning of controls	●				●	●	●		●					
Control and power cabinet fires	●				●				●	●		●		●

Common electrical faults on diesel electric locomotives and possible causes were outlined by Mr. Horine in conjunction with his study of the cost of dirt. This illustrates the complex problems of determining exactly what role dirt does play in deterioration and unreliable operation, and the difficulty of assigning exact cost

Pete's Average Goes Down

by Ken Wright



'Jim", stormed Pete, "did you drag me away from ny bowling just to tell you this car was out of uel?"

Apex Cold Storage Plant had asked for a mechanical refrigerator car to load with frozen chickens. The car was to be precooled, but the plant manager wanted the equipment shut down while the loading was going on. When the car was spotted at the loading dock about 9 am, the manager noticed that the refrigeration equipment was already shut down. He thought this rather strange, but assumed that it had been done over in the railroad yard just prior to delivery. After all, the temperature inside was eight below zero.

It was afternoon before loading began and by then the car's temperature had risen several degrees. When the side door was opened, cold air inside spilled out and was replaced by the warm outside air. Even though a canvas tunnel was used to connect the car door to that of the warehouse and, although the car was rapidly filled with chickens brought from five below zero storage, the temperature of the mechanical reefer was quite high by the time loading was completed and the door closed. The manager had had some experience with starting and stopping the equipment on these mechanical cars. He tried to start the diesel engine and failed. After several attempts, he gave up and called the railroad, stressing the necessity for immediate action. The car's temperature was rising to a dangerous point.

The clerk who took the plant manager's call was not sure what to do. Everyone he called came up with answers like "I don't have anything to do with those cars!" or "Not my baby. Might try Jones." Finally, the freight agent, who was in on it by now, contacted Big Jim who admitted that it probably was his job. His man, Pete, had done work on another mechanical car recently. Jim was advised of the urgency and was told the location and number of the car.

Big Jim knew he was in a spot. His best man, Pete, had just finished work for the day and was on his way home. The men on this trick were willing enough workers, but definitely not the best trouble shooters in the world, or even at this terminal. It seemed too bad to send two men to look at the car, but it might be safer. Sometimes two heads are better than one.

Tony and Mike started out for the Apex plant with as many instructions as Big Jim could give in five minutes. On the way, Tony and Mike confessed to each other their complete ignorance about mechanical reefers. "Well," Tony consoled himself, Jim said there was an instruction book on the car, and I guess we can read that."

The first minutes after arrival at the car were spent looking it over and identifying various parts. Finally it was agreed that they had to get the engine started first. They tried cranking the engine by pressing the Start button. It turned over with the starter but showed no other signs of life. After about an hour and a half, Tony said that he was going to call Big Jim and tell him that they were getting nowhere.

Unconcerned about what might be said concerning overtime, Big Jim went to the phone and called Pete's house. Pete had left to go bowling—this was his league night. Jim jumped into his car and headed for the bowling alley. Of course, as soon as Pete saw Big Jim, he started complaining. "It always happens—something to spoil the fun. What's wrong now?"

Big Jim told him as much as he knew about the ailing car. He attempted to placate his ace trouble-shooter, saying that maybe Pete could fix the car and still get back to the bowling alley in time.

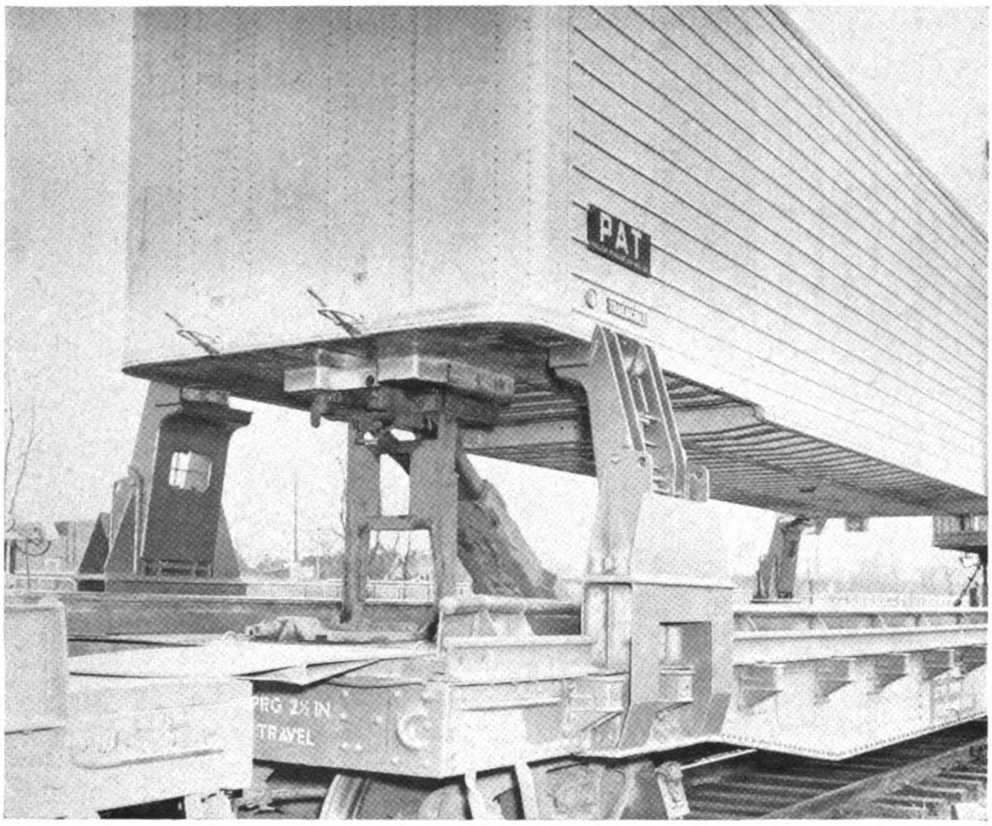
"You dreamer, you!" growled Pete. Big Jim drove Pete to the storage plant a bit faster than the law allowed. Arriving at the car, Jim asked Tony and Mike what they had done. From the replies, it seemed that they had worked on everything, but the car's hand brake.

Meanwhile, Pete had borrowed a flashlight because it was now long after sundown. His light fell on the gage of the fuel tank under the car. It read empty. "Jim," stormed Pete, "did you drag me away from my bowling just to tell you this car was ho fuel on it?" Pete went on, expressing his displeasure in several other ways. This time he really had reasons for grumbling; and it is his favorite pastime. Big Jim was seething too, but he would talk to Tony and Mike later.

"Pete, is fuel oil all that it will take to get this deal cooking again?"

"Not cooking, Jim," replied Pete, "cooling! No, now it will take a little more than that. The whole fuel system will need priming. Apparently the engine died just before the car was switched in here and it did this because

(*Continued on Page 42*)



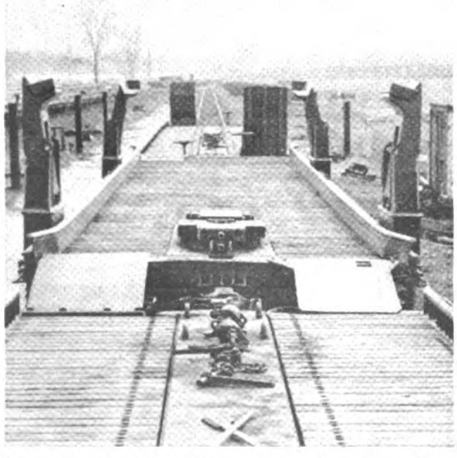
Trailer hitch in position, removing load from front piers. King pin support has already been elevated.

Union Pacific Tests Pullman's PAT Piggyback

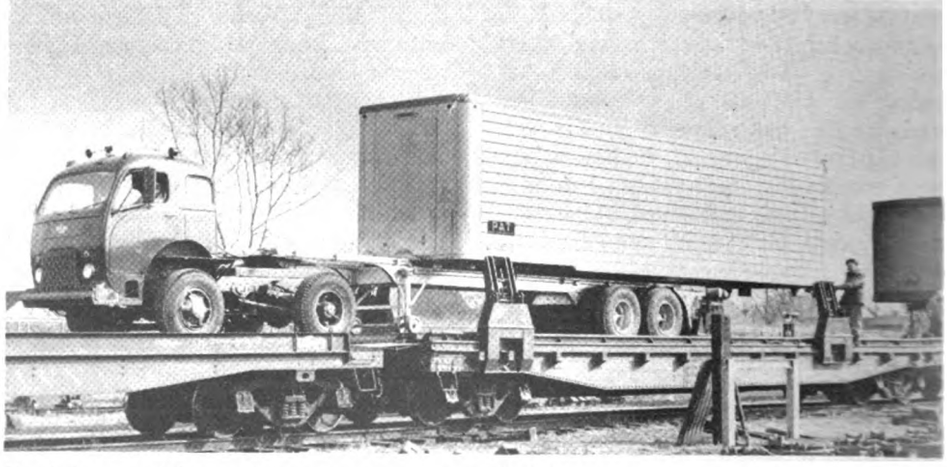
A PROTOTYPE of a piggyback container system, announced by Pullman Standard and Trailmobile four months ago, is being tested by the Union Pacific. Called PAT (*P*ullman *A*nd *T*railmobile), the system can use existing ramps, tractors and flat cars. The demountable containers can be handled by forklift or overhead crane. Car conversion was done by Pullman.

Trailmobile furnished two 35-ft chassis and one 35-ft container. A standard Union Pacific flat car was modified by adding guard rails, four support piers and a trailer hitch. The adjustable hinged pier supports can be moved outward for loading standard wheeled trailers and the PAT unit where the container is left on chassis.

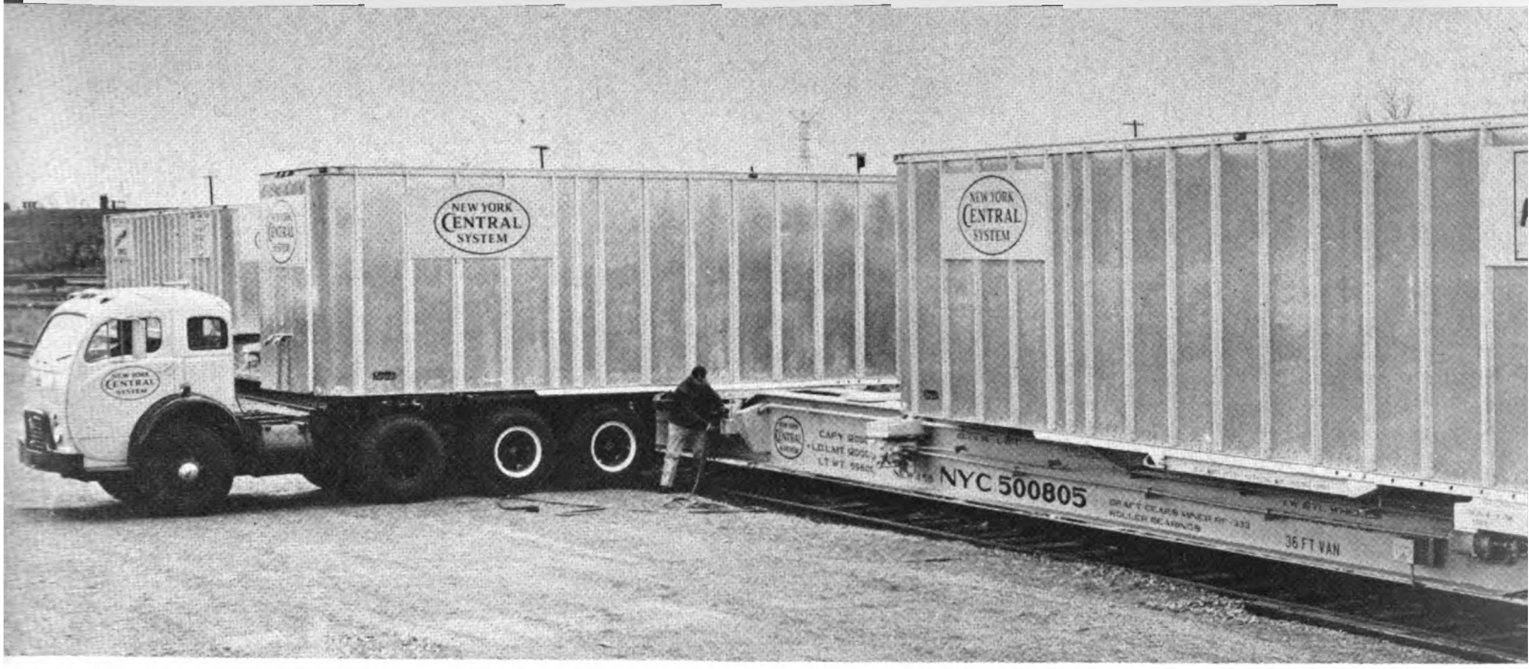
In shipping the container only, the chassis-container unit is backed onto the car. As the rig is positioned, slide plates at rear corners of the container engage piers at the rear of the car. When container is spotted, the front support piers are positioned, temporarily holding the container in place. The two locking devices holding the container to the chassis at the rear are disengaged and the air is exhausted from the springs. The container lowers into final position, locked to the rear supports. Two similar locks at front of the container are freed, and chassis is pulled away by a tractor. The trailer hitch is raised engaging the king pin, lifting the front of the container off the front support plates. The car is then ready to roll.



By adding two support piers at center of car two smaller containers can be shipped.



Chassis is removed from container. Rear of container is locked in place and temporary front support holds container until trailer hitch is raised.



urntable design enables delivering driver to load his own trailer and eliminates the consecutive circus-type loading of most conventional piggybacking.

NYC Begins Flexi-Van Operations

NINE HUNDRED highway trailer bodies, 50 double-tandem wheel-and-axle assemblies, and 172 special railroad cars will be utilized by the New York Central in its recently inaugurated piggyback operation. When all delivered, this equipment will cost over $8,000,000.

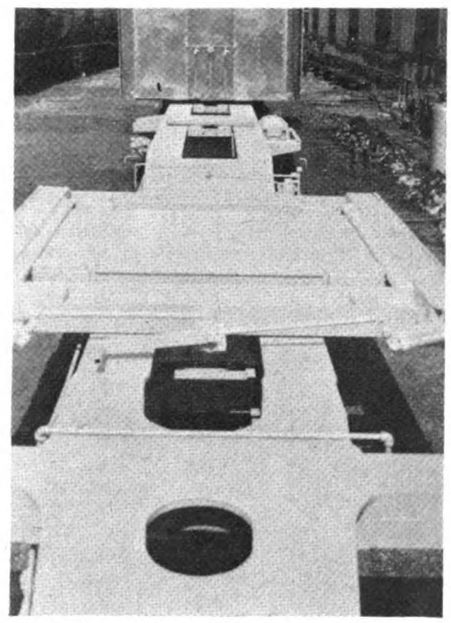
All of the equipment including the cars is being built by Strick Trailers. This new car builder has used components from many traditional railroad suppliers. The center sill of each car is composed of two 33-in., wide-flange, high-tensile beams. These beams are cut and formed to be depressed under the two turntables on the body. At each end, they are welded to special General Steel end castings.

The trailer bodies are cushioned on special Waugh cushion assemblies in the turntables. These tables each have hydraulic cylinders operating at 10,000 psi to develop a lift of 90,000 lb, although the cars are designed to carry only two 60,000 lb trailer bodies. Hydraulic pressure lifts the turntable from its locked rail-haul position so it can be swung by hand to a position at right angles with the car centerline for loading and unloading. The 12-volt hydraulic electrical system is fed from the battery of the unloading tractor.

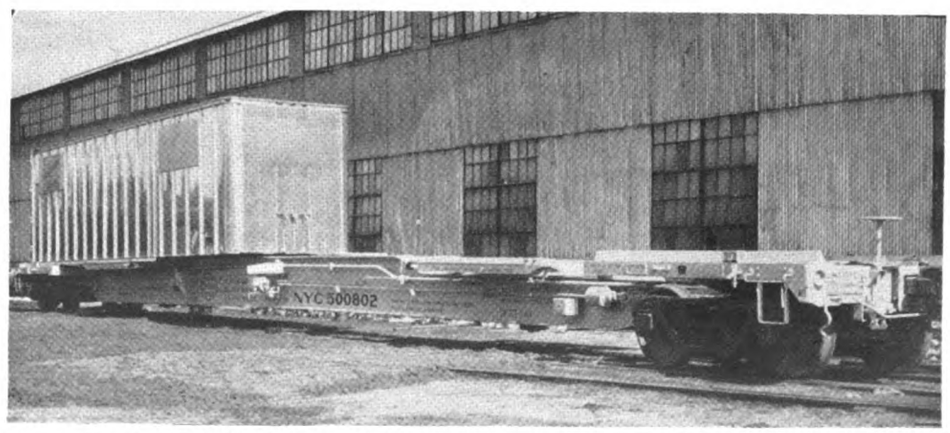
Overall length of each Flexi-Van rail car is 83-ft 3-in. between pulling faces. The car will transport a 40-ft (or shorter) trailer body at the A end, and a 36-ft container at the B end. Because of the length, the cars have separate body-mounted brake cylinders and automatic slack adjusters for each truck. The last 22 cars will be for passenger service with multiple-wear wheels, and signal and steam lines.

Partial List of Suppliers

Truck side frames	American Steel Foundries
Bolsters	Symington-Gould Corp.
Springs	Alco Products, Inc.
	Crucible Steel Co. of America
Side bearings	A. Stucki Co.
Axles and wheels	Bethlehem Steel Co.
Roller bearings	Hyatt Bearings Div., GMC
	Timken Roller Bearing Co.
Brake beams	American Steel Foundries
	Buffalo Brake Beam Co.
Brake shoes	American Brake Shoe Co.
Brake forgings	Pittsburgh Forgings Co.
Brake-pipe fittings	Gustin-Bacon Mfg. Co.
	Westinghouse Air Brake Co.
Hand brake	National Brake Co.
Pneumatic slack adjusters	New York Air Brake Co.
Draft gears	Cardwell-Westinghouse Co.
	W. H. Miner, Inc.
Couplers	National Malleable & Steel Castings Co.
End Castings	General Steel Castings Corp.
WF beams and deck plates	Bethlehem Steel Co.
Turntable posts	General Steel Castings Corp.
Turntable shock absorbers	Waugh Equipment Co.
Hydraulic cylinders	Kalamazoo Div., N.Y.A.B. Co.
Hydraulic system	Blackhawk Manufacturing Co.
Receptacles	Joy Manufacturing Co.



Trailer "side sills" slide in guides on these tables and the body is then locked in place.



Camber of 2¼-in. is built in these cars which have light weight of 60,000 lb. Car is heavy enough to balance a trailer with unsymmetrical load.

What Next for Solid Bearings?

Examinations of used journal bearings show that improper weight distribution, uneven end wear, and bearing lining deformation are major reasons for bearing removals. Overcoming these deficiencies and providing a proper oil seal should improve performance of the solid journal bearing assembly.

There are numerous reasons for the lack of comprehensive data on hot box causes. The large number of journal-box assemblies in service, their low incidence of failure (based on 1956, set-outs occur once each 11.8 car-years), and the fact that failures frequently destroy all evidence all have a part in this.

In 1953 data submitted by fourteen AAR member roads indicated that waste and lint under bearings accounted for 53.77 per cent of all hot boxes. This added to other waste-pack deficiencies, accounted for a total of 77.16 per cent of all hot boxes. Mandatory use of lubricating devices in lieu of the waste pack should substantially reduce this.

An inspection made at a Magnus plant of 3,205 consecutive bearings turned in for scrap determined the pattern of load distribution. The bearings inspected had not been overheated, but the 32.7 per cent with excessively heavy loading at either end, or at both ends were potential trouble makers.

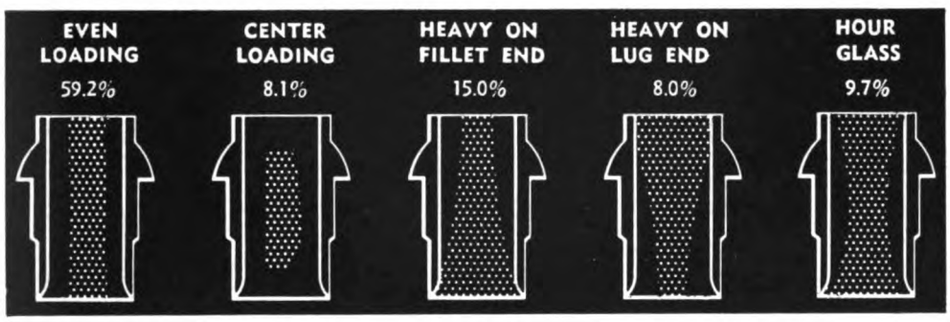
The crowned journal-bearing wedge as the load distributing medium in the box can fail to function if worn flat, if bent and distorted, or if the box roof is worn concave.

Tests made in 1950 by the Santa Fe indicate a nominal full thickness wedge used with a standard 5 x 9-in. depressed-center-back bearing tends to distribute more than a proportionate share of the load on the ends of the bearing. As wedge thickness is decreased, the load on the center increases. Using a full thickness wedge and a flat-back bearing, the greatest load is on the center of the bearing. The load on the center of the bearing increases as the wedge thickness is decreased.

The cause of unfavorable load distribution indicated by 23 per cent of the Magnus-inspected bearings with heavy end loading is evident if an inspection is made of older cars in service. Large numbers of the cars now operating are so old that highly undesirable box roof conditions have developed. Few railroads are making repairs to correct this condition. Removable wear plates in the box roofs of integral side frames are now an AAR alternate standard. Many years must elapse before enough such side frames are in service to improve this situation. Other undesirable conditions on old cars causing improper weight distribution are loss of side-bearing clearance, loose body bolsters, and fouled center plates.

The obvious solution is more thorough truck overhaul in conjunction with heavy car repairs. At the same time, every step should be taken to insure the quality of journals produced by wheel shops.

An abstract of the paper "Available and Potential Developments in Design for Standard AAR Solid Bearing Assemblies," by M. A. Hanson, chief engineer, Magnus Metal Corp., presented at the ASME-AIEE Cleveland meeting on April 10.



Load distribution on over 3,000 bearings was determined by examining the wear patterns. Results of these examintaions showed that over half were uniformly loaded from end to end.

Distribution of Bearing End Wear on 10,000 Bearings

(Inspections of consecutive scrap bearings received at a Magnus plant)

	Slight wear*	Moderate wear*	Heavy wear*	
Lug end only	2,368	905	230	3,503
Collar end only	279	704	202	1,185
Both ends:				4,119
At lug end	2,180	1,423	516	
At collar end	554	1,968	1,579	
Total showing wear				8,807
Number showing no end wear				1,193

*Slight wear is 1/16-in. or less, moderate wear is 1/16 to 3/16-in., and heavy wear is over 3/16-in.

How Wedge Thickness Affects Load Distribution

Results of tests conducted by the Santa Fe in 1950

16,000-lb journal load on 5- x 9-in. wedges

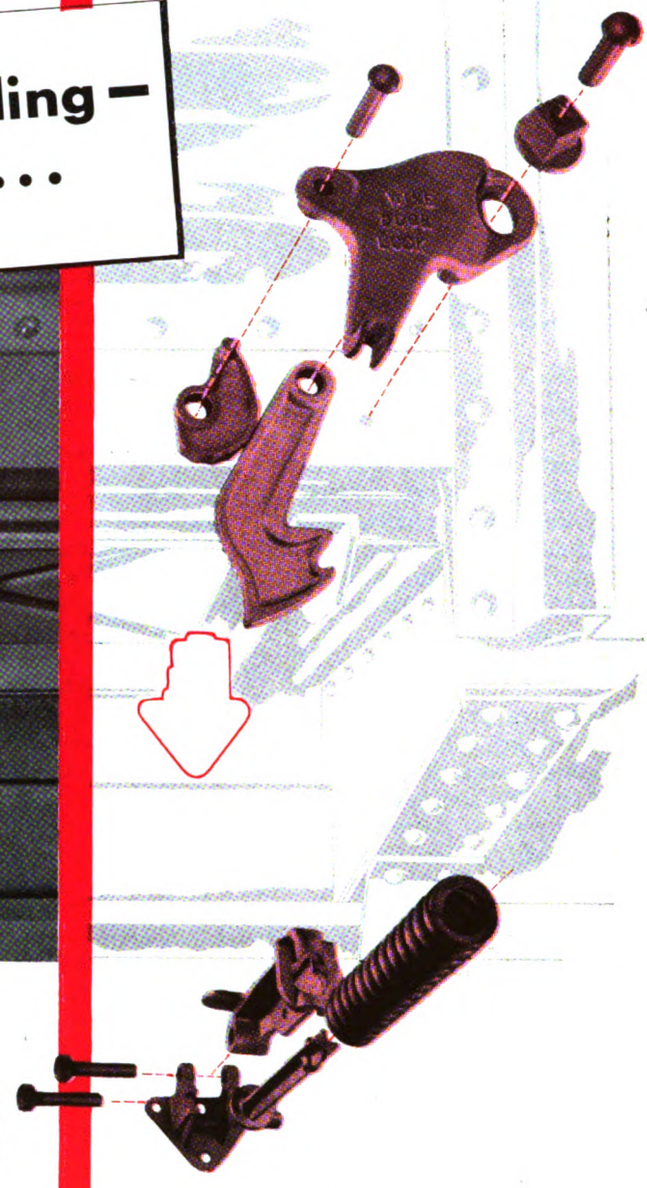
	Wedge thickness, in.	Load on center, lb	Load on each end, lb
Crowned wedge (AAR standard)	0.960	4,750	5,630
" " " "	0.906	5,120	5,450
" " " "	0.812	5,730	5,140
" " " "	0.760	6,220	4,880
Flat back wedge	0.950	5,600	5,200
" " "	0.900	5,940	5,025
" " "	0.850	6,320	4,850
" " "	0.800	6,725	4,625
" " "	0.750	7,150	4,400

Spread Linings

Spread linings are recognized as a hot-box cause by AAR Interchange Rules which says that a bearing is condemnable whenever the lining is spread 1/8 in. or more below the bottom edge of the bearing. This is a common defect. Twenty one per cent of 1,274,328 bearings found in the scrap of 25 railroads showed this defect. Spread linings are caused by fore-and-aft movement due

(*Continued on Page 42*)

Controlled Unloading — Easier Closing . . .



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- INDIVIDUAL, POSITIVE DOOR FIT
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For All Drop Door Gondolas . . .

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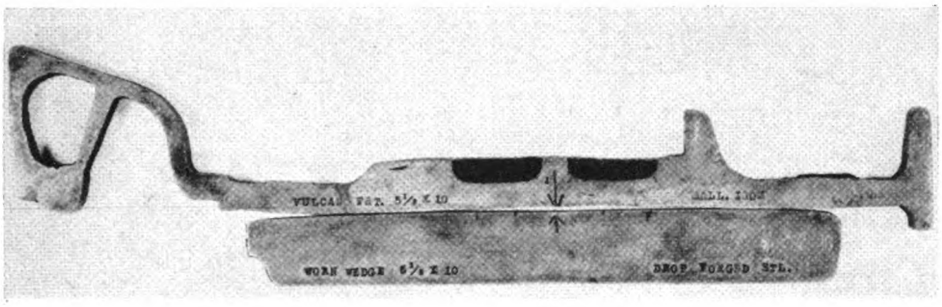

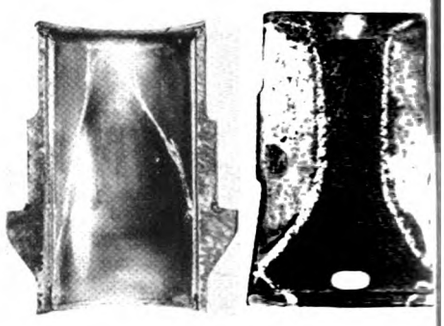

Crowned journal bearing wedge (above) fails to distribute the load evenly when box roof is worn. Even new wedge will not operate properly. Pedestal boxes operating with worn liners and separable boxes with loose bolts tend to load the sides of wedge and produce uneven bearing wear (at right).

(*Continued from Page 40*)

to impacts and by the thrust of single shoe brakes. This fore-and-aft movement frequently is so great that the dry seat of the axle strikes the walls of the dust-guard well. Occasionally, an axle collar will foul against the box wall and wear a hole through the journal box. This type of damage can be eliminated by journal stops.

Unequal Thrust

To obtain data on the wear on each end of the bearing, 10,000 consecutive scrap bearings were inspected at a Magnus plant. This indicated that most of the heavy wear is occurring on the ¾-in. fillet end rather than at the wedge end. More desirable would be evenly distributed wear at both ends. The end of the bearing which receives the greater thrust can depend on the location of lugs, on bearing collar thickness, and on over-all length. A more inboard lug location increases thrust on the lug end; greater bearing collar thickness increases thrust on the ¾-in. fillet end. Wear of other journal-box components introduces additional variables.

Now under way, an AAR project to determine optimum bearing design will evaluate ¼-in. longer bearings with several lug locations. This is an attempt to equalize thrust loads and also to reduce journal-box assembly lateral.

Oil Leakage

Several problems are encountered in attempting to seal a journal-box assembly. The longitudinal movement of the journal must be restrained because no seal can be expected to perform with ¾ in. of fore-and-aft travel. Lateral will have to be restrained so the axle dry seat remains in contact with the rear seal; or, the seal should be designed to maintain such contact with present lateral. The present 5½- x 10-in. box assembly, with all parts worn to a maximum, can have as much as 2⅜ in. lateral. A reduction of oup to ½ in. in total lateral appears feasible by modifying journal-bearing dimensions.

A considerable number of rear seals are now undergoing field tests. Some have been found in fair condition after operating up to 140,000 miles in interchange freight service on cars fitted with journal stops. If fore-and-aft journal movement is controlled by journal stops and if lateral is held within reasonable limits, practical sealing of the rear box opening does not seem far off.

Under most service conditions, little oil is lost from the journal boxes at the lid (except at car dumpers), but experience has demonstrated that an effective rear seal requires the use of a lid seal. If the rear opening is sealed tightly, the journal begins to act as a pump piston during lateral movements. The partial vacuum which is created tends to bring in dirt and snow. Several reasonably effective lid seals are already available. With them, venting of boxes may be necessary. Vents can be provided cheaply.

Summary

To further improve the performance of the solid bearing assembly and reduce its servicing requirements, the following are indicated:

- Improve bearing load distribution with more thorough truck overhaul.
- Stabilize the journal-box assembly with journal stops.
- Equalize bearing end thrust and decrease lateral by modification of the bearing design.
- Reduce oil leakage by using rear and front seals.
- Maintain acceptable standards of journal finishing.

The total effect should be substantially improved performance. The overall cost of such a program would not be exorbitant and should be quickly recovered through operational savings.

Pete's Average Goes Down

(*Continued from Page 37*)

it ran out of fuel. That means that the fuel lines are full of air, and the pump won't pick up oil from the tank without priming."

"Pete," Big Jim broke in, "show these two guys how to do this priming and I'll run to the phone and get some fuel on the way over. I'll still get you to your bowling in time."

Pete reminded Jim that these small diesels would burn only No. 2 diesel oil and not the "economy" fuels the company was now using on its diesel road locomotives. He then showed Tony and Mike how to remove the pipe plugs from the tops of the two filter bowls to pour fuel directly into them. He went on to point out the fuel manifold through which oil is distributed to each of the injectors, and demonstrated how fuel should be poured directly into it. He warned that extreme care should be taken to insure that the plugs were replaced tightly so no further air could enter the fuel system. He added that it might be necessary to refill the filters a second time before the pump would pick up the fuel and let the engine run. By then Big Jim was back and ready to return Pete to the bowling alley.

Next morning Pete went into the office after being summoned by his boss. "Pete, you never cease to amaze me. What made you find that empty tank so quickly last night?" "Well," explained Pete, "a diesel engine needs four things to run—fuel, ignition, lubrication and cooling. Lubrication or cooling failures won't prevent an engine from starting, but either one can keep it from continuing to run. Ignition is a matter of rotation combined with compression. We apparently had both last night. Fuel failure was the most logical place to start. No use checking the fuel pump, piping, filters and things like that until you know you have a fuel supply. I'm glad we got that car operating with no more trouble, but you fellows sure ruined my game. I only averaged 230."

Pete likes to complain!

CLEANER, LONGER LASTING

Esso Diol RD crankcase oils meet the need of modern diesels for very effective and economical detergent lubricants that will provide maximum protection for sensitive engine parts.

Even after the most severe freight or passenger operation, engines using Diol RD are exceptionally clean. They show a minimum of carbon deposits in the piston ring zone... very little lacquer or varnish on piston skirts and exhaust valve stems. And Diol RD oils effectively prevent corrosion of the silver wrist pin bushings or alloy bearings.

The good oxidation stability of the base stock in Diol RD oils is bolstered by the detergent-inhibitor additive used. Result: greater mileage between oil changes, with consequent lower costs. For data or technical assistance call your local Esso office or contact: Esso Standard Oil Co., Railroad Sales Division, 15 W. 51st St., New York 19, N. Y. *perfected by research... proved in performance*

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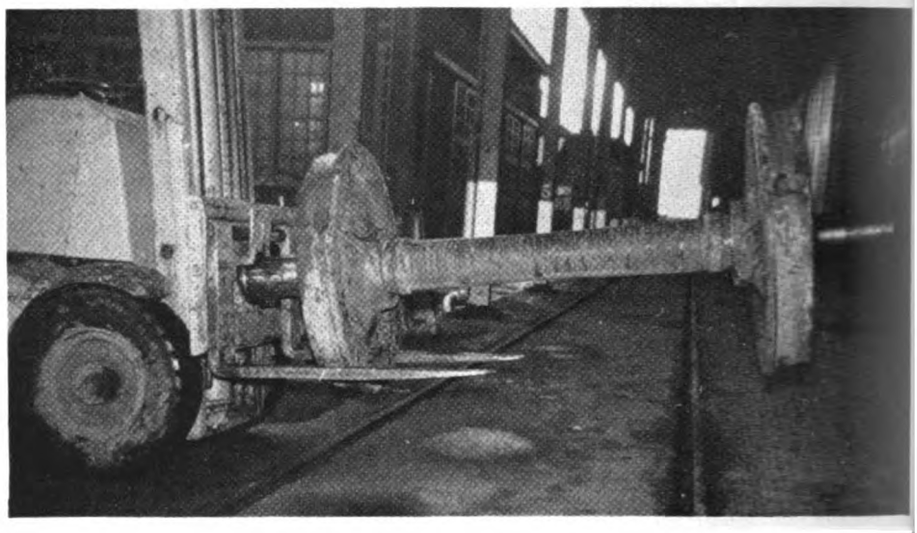
RAILROAD PRODUCTS

CAR REPAIR TIME-SAVERS

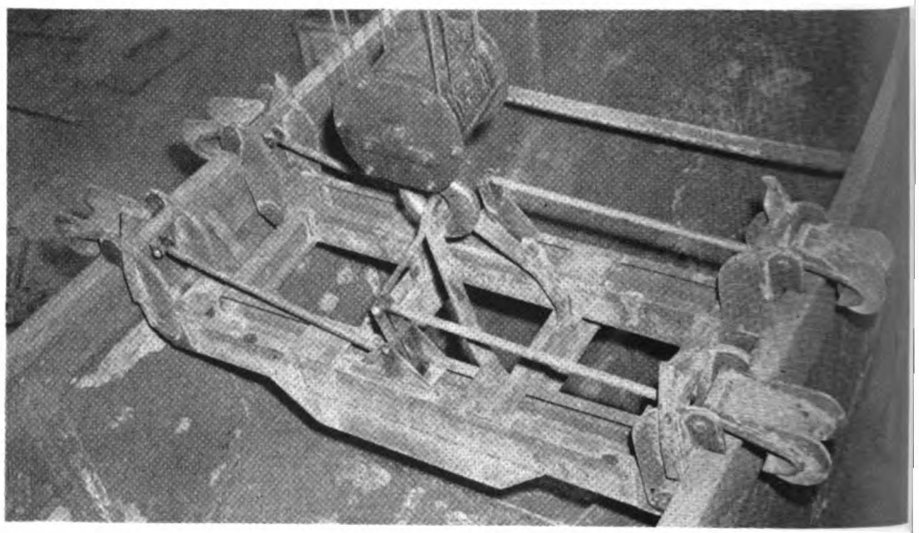
Southern Pacific Wheel-Handling Fork Lift

Southern Pacific's Hyster fork lift at Brooklyn, Ore., shop was fitted with a retainer so that wheels can be moved and placed on tracks easily. Retainer is a 3-in. length of 6 by 11-in. journal brass brazed to two steel plates and welded into the truck's lifting frame so the axle end is held down while the wheels are being lifted. The journal collar comes against the brass and is not damaged. End handling of wheels simplified their movement into and out of restricted spaces.



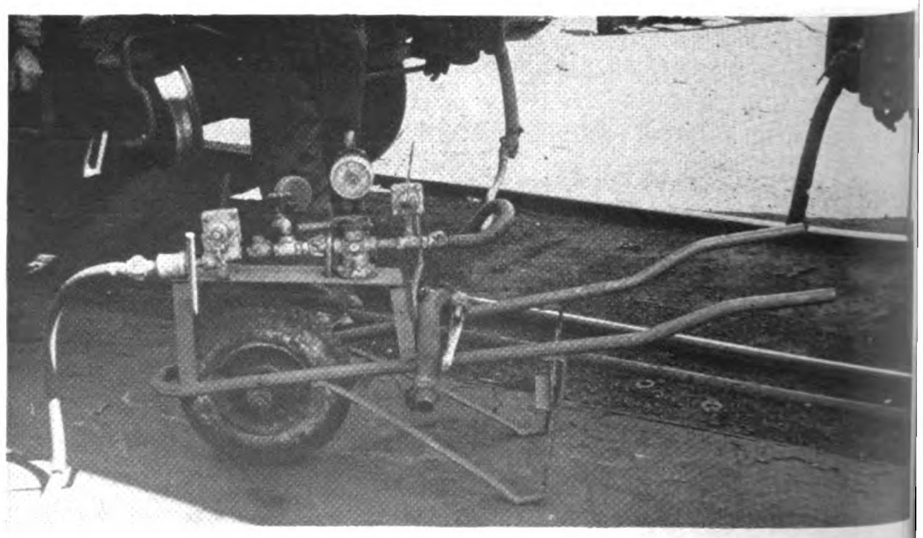
Illinois Central Hopper Body Lifting Device

Lifting device consisting of four clamps with toggle-joint arrangement made it possible for Illinois Central to use a single overhead crane for handling car bodies during a repair program. Device was used for placing the bodies back on their trucks. This unit was developed by A. E. Jones, derrick engineer at the IC's Centralia, Ill., shop.

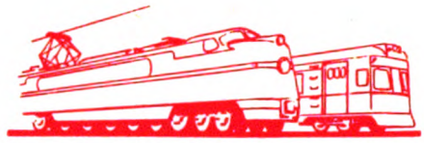


Fruit Growers Express Single Car Tester

Single car air brake testing device is mounted on a wheel barrow frame at the Jacksonville, Fla., shop of the Fruit Growers Express. Frame has space for carrying extra hoses and tools. Longer hoses used during the brake tests can be coiled and carried on it when the tester is being moved to another car.



DIESELS



ELECTRICS

MU CARS

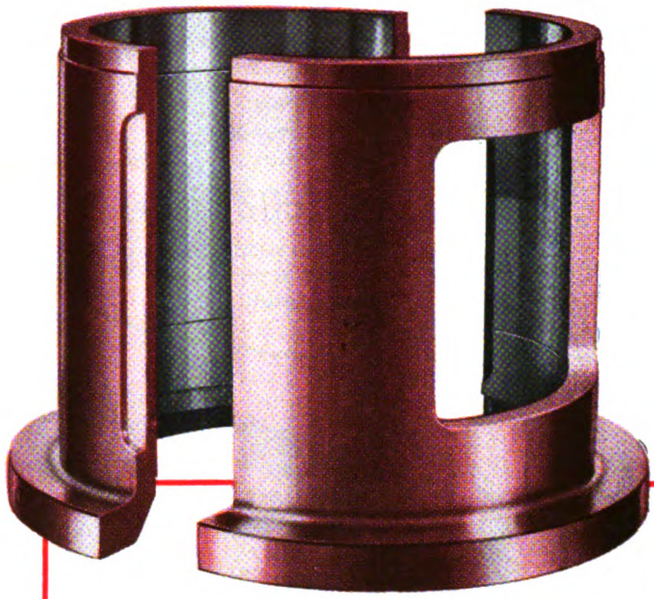
ALL can have EXTRA, TROUBLE-FREE MILEAGE with Magnus traction motor support bearings

EVERY make and model of diesel-electric and electric locomotives or MU cars ever built can take advantage of the extra precision and trouble-free performance of genuine Magnus HIGH MILEAGE traction motor support bearings. These super-precision replacement bearings, designed and built by bearing specialists, can be obtained by any Railroad directly from Magnus Metal Corporation.

Each of the features at the right makes an important contribution to that extra safety factor found only in Magnus traction motor support bearings. And the present-day trend to higher mileage between motor overhauls call for this added cushion against costly breakdowns.

What's more, Magnus high-speed, high-precision production methods can manufacture these bearings so economically that relining or rebuilding is both unnecessary and impractical.

For the complete story on Magnus HIGH-MILEAGE traction motor support bearings, write for your free copy of Bulletin No. 6000, Magnus Metal Corporation, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4, Ill.



FEATURES

1. Perfectly mated bearing halves
2. Heat-resistant Satco lining metal
3. Interchangeable double keeway
4. High strength brass backs
5. Improved flange fillet profile — no "feathering," no "riding."
6. Precision finish boring to extremely close tolerances.

MAGNUS

High Mileage

OTHER MAGNUS PRODUCTS FOR DIESEL LOCOMOTIVES

Wheel Flange Lubricators

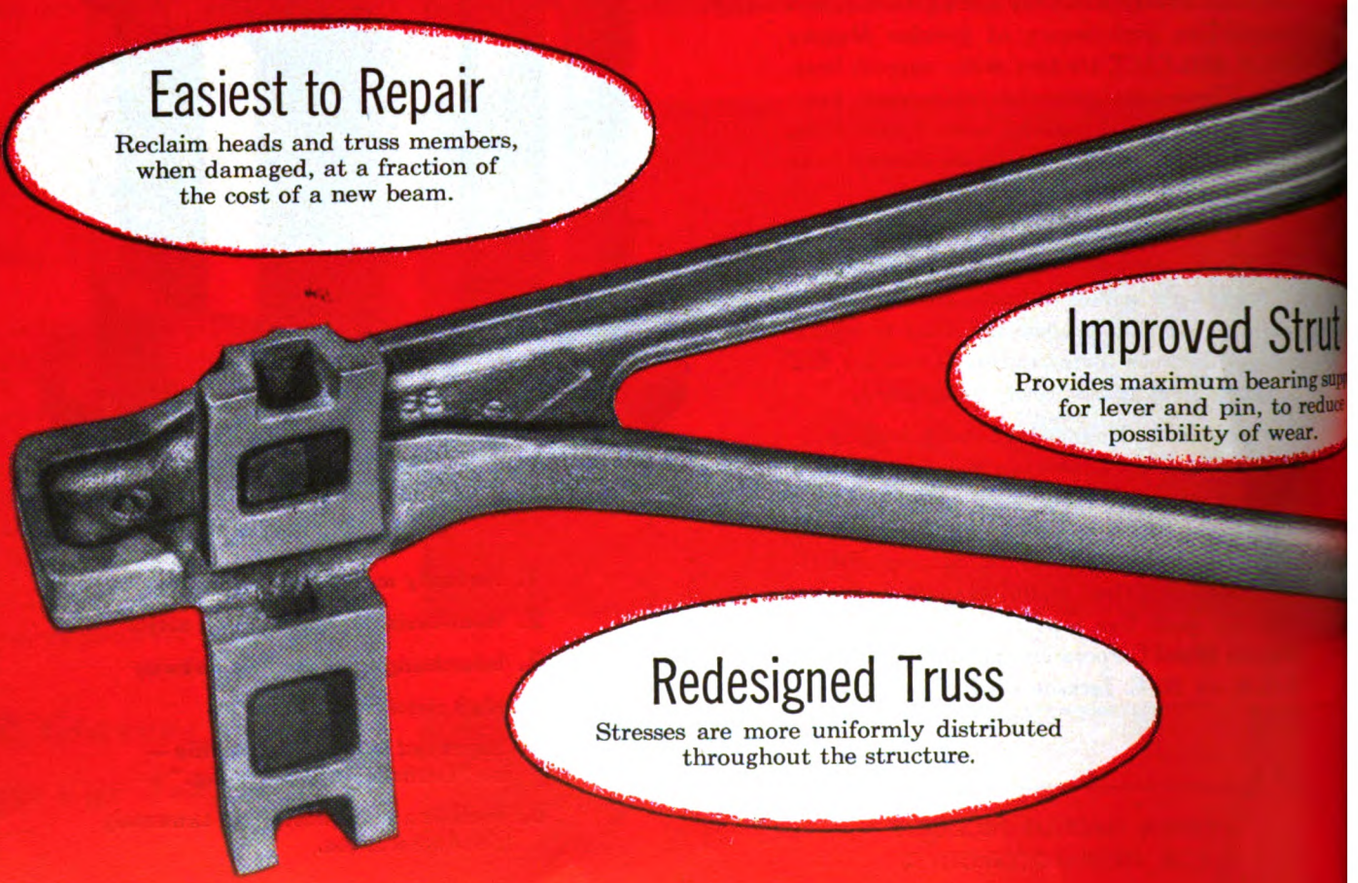
Safety Valves

Fuel Tank Sight Gages

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**

New and better...

1958 ASF No. 1



Easiest to Repair

Reclaim heads and truss members, when damaged, at a fraction of the cost of a new beam.

Improved Strut

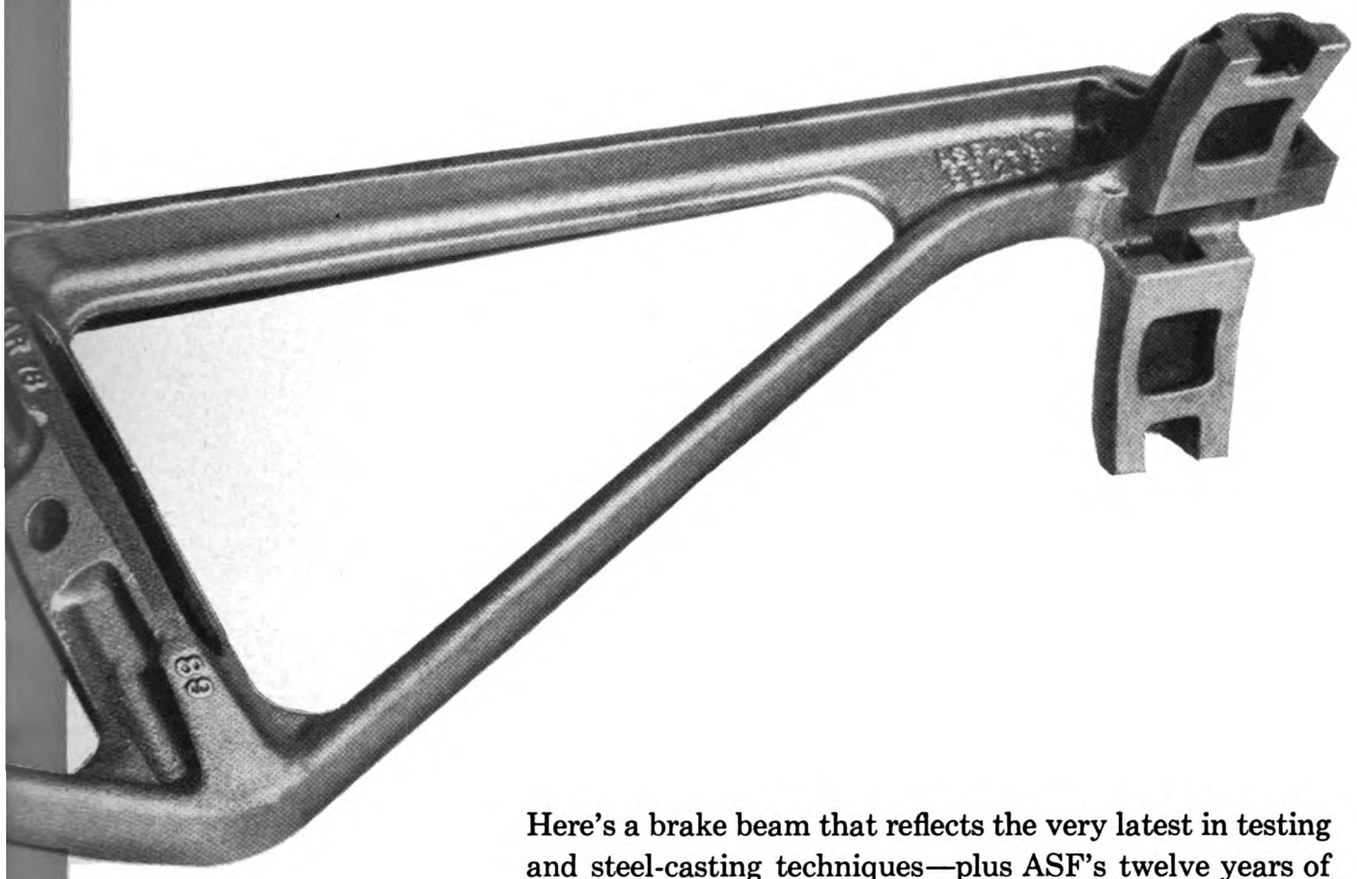
Provides maximum bearing sup for lever and pin, to reduc possibility of wear.

Redesigned Truss

Stresses are more uniformly distributed throughout the structure.

For HIGHER safety margins...
at LOWER operating costs...specify .....

ast-Steel Unit Beam



Here's a brake beam that reflects the very latest in testing and steel-casting techniques—plus ASF's twelve years of service experience with this type of beam. Like its predecessor, this new beam is built to stay on the car and out of the scrap pile . . . except that the new design will give you even *better* performance.

ASF

CAST-STEEL UNIT BRAKE BEAMS

AMERICAN STEEL FOUNDRIES

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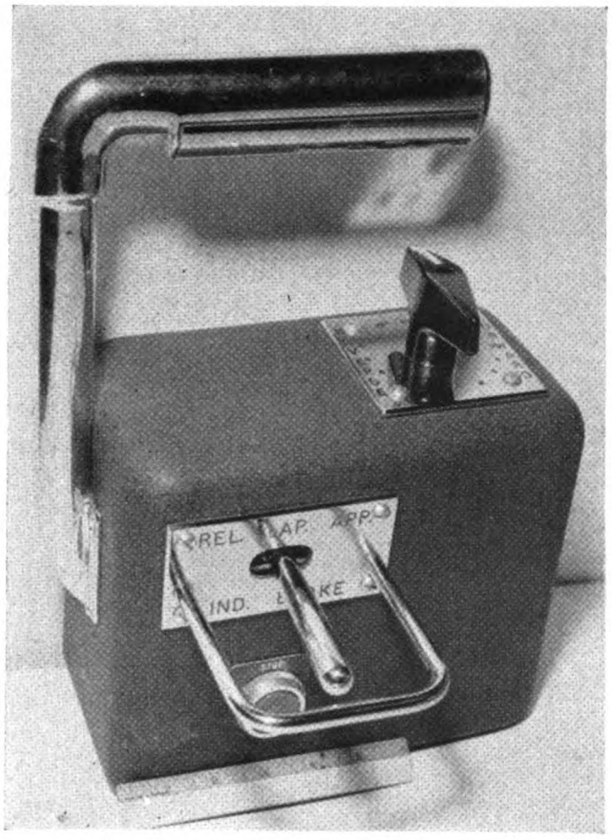
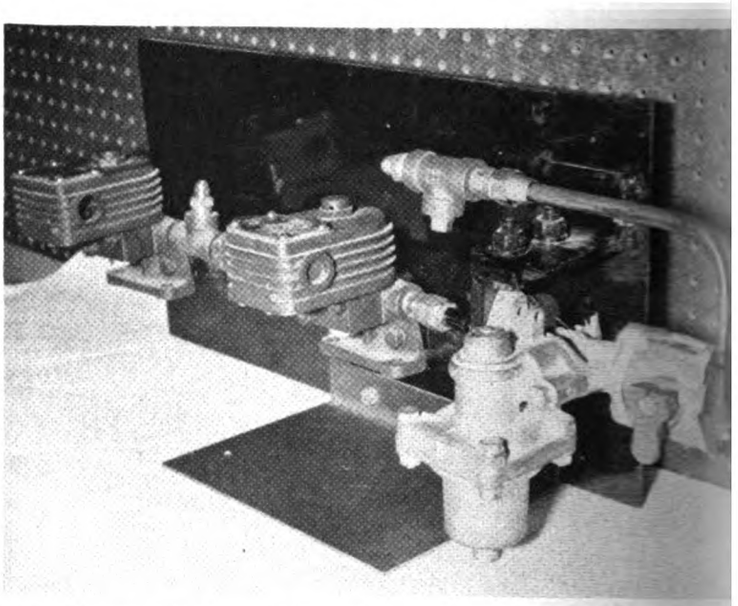
GEARED TO PROGRESS
P R I
METEL





Above: Equipment to be mounted on the locomotive, as part of the portable c station, consists of a reducing valve, two solenoid valves and a check valve for c of the locomotive brake and another solenoid valve to work in conjunction wit "dead man" control.

At left: Portable control station, developed by General Motors Diesel, has 14-cond receptacle in base from which control cable runs to locomotive control stand.

Portable Controller for Locomotives

Developed for Canadian Pacific, this unit makes possible complete control from any cab location

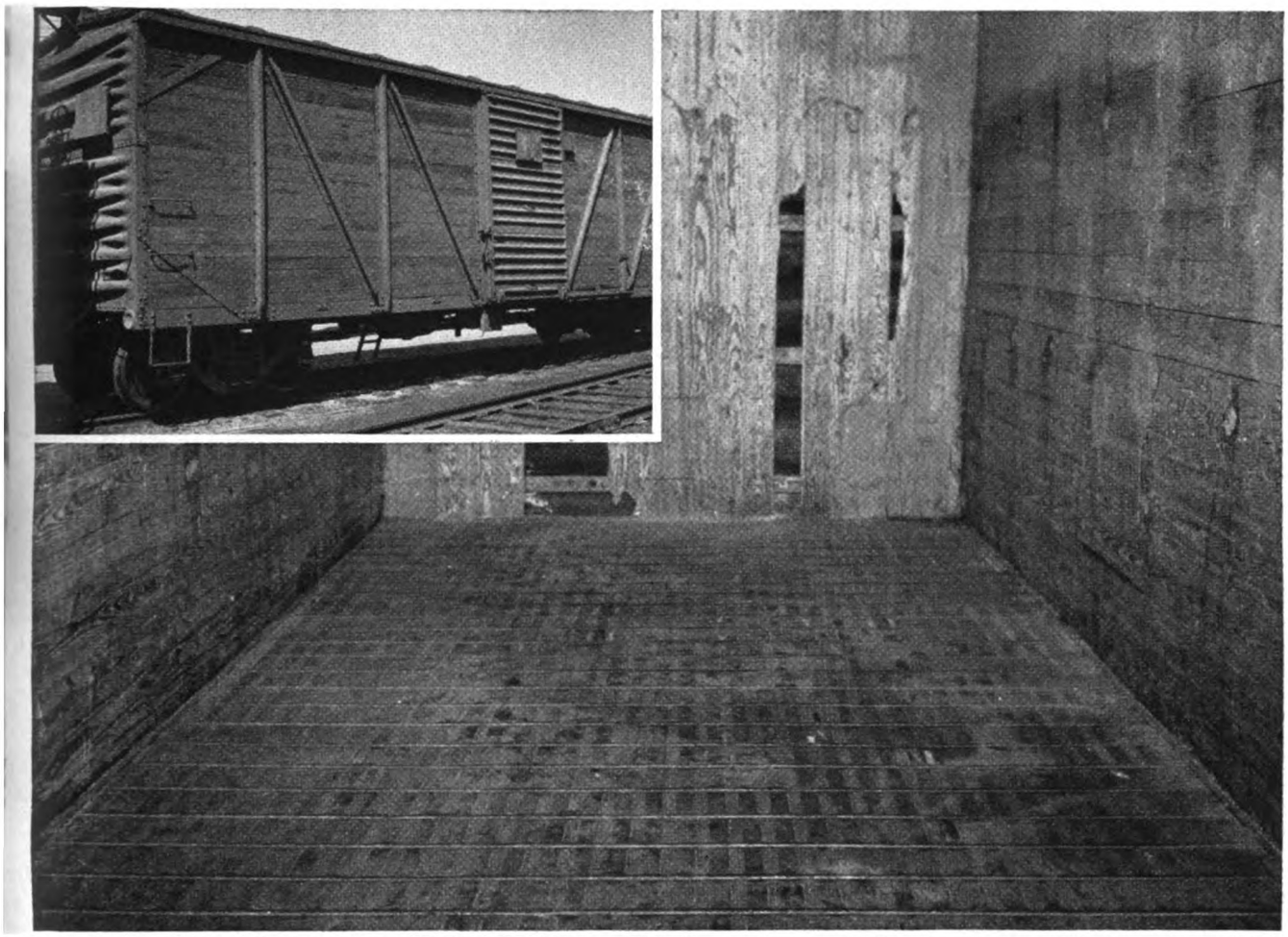
A PORTABLE CONTROL STATION permitting the operation of diesel-electric locomotives from any location in the cab has been developed by General Motors Diesel, London, Ont. Its operation was demonstrated during Royal Commission hearings on the elimination of Canadian Pacific firemen.

Measuring 5 by 8 by 9 in. and weighing 14 lb, the portable control box is equipped with a combination throttle and reverser handle, a brake lever, an emergency stop pushbutton, and a combination deadman control and carrying handle. A 14-conductor flexible cable plugs into a receptacle on the bottom of the control box and to the locomotive control stand.

The combination throttle and reverser handle makes it impossible for the operator to change from forward to reverse unless the throttle is at idle position, and an interlocking mechanism prevents changing from forward to reverse without stopping the handle at idle.

As long as the portable control box is carried or held by the handle, the "dead man" safety control is paralleled with the existing locomotive safety control foot pedal and is in a safe position. The brake handle applies and releases the locomotive brakes by electri controlling the solenoid valves w initiate the supply or exhaust of a the brake cylinders at a controlled Thus, the length of time that the ha is held in either the apply or release sition determines the amount of pres in the cylinders. A fail safe circu employed to apply the brakes when circuit is interrupted.

When the portable control box is in use, a bracket on the regular gineer's control stand is provided storage. A similar control device locomotives with pneumatic throttle been developed.



Unretouched photograph of 28-year-old boxcar interior in shop for interior repairs. N-S-F *in Class A condition.*

N-S-F® STILL IN CLASS A CONDITION AFTER 9 RUGGED YEARS

NAILABLE STEEL FLOORING is made of low-alloy N-A-X HIGH-TENSILE steel—remarkably strong, corrosion resistant—formed into channels, and welded together to form a unique nailing groove. Nail is clinched in a tight grip of steel, yet can be readily removed.

Back in July, 1949, a midwestern railroad installed NAILABLE STEEL FLOORING in one of its boxcars, then a veteran of 19 years on the line. After nine years spent in hauling grain, paper, plaster board, carbon black and countless other items, the floor is still in Class A condition and almost as good as new. What makes this record more important is that the car has no stringers and only one pair of cross ties at each end. N-S-F in 2⅜" 10-gage spans the floor from side sills to center sill.

Obviously, N-S-F adds a lot of strength to critical points in the underframe. It stands up under the heavy impact of lift truck loading. It may even outwear the car itself. Full information and cost studies on the use of N-S-F in freight cars is readily available from Stran-Steel representatives in Chicago, New York, Philadelphia, St. Louis, Cleveland, San Francisco, Minneapolis and Atlanta. In Canada, N-S-F is made and sold by International Equipment Co., Ltd., Montreal.

Over 60,000 cars have been equipped with N-S-F.

NAILABLE STEEL FLOORING
Originated and sold by—
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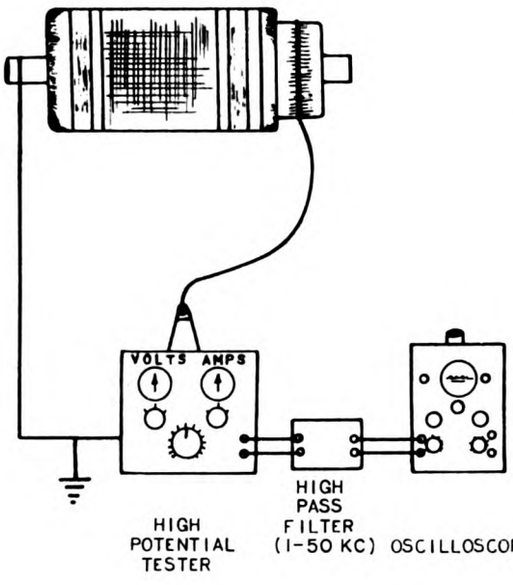


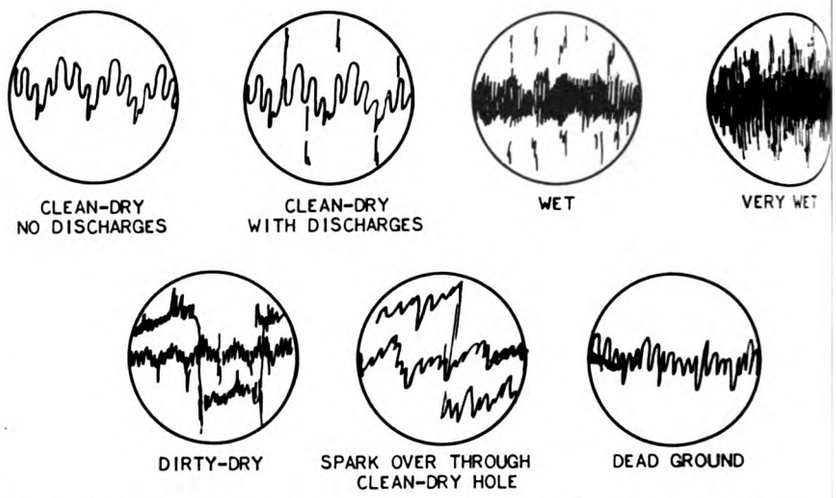


Fig. 1—Simplified connection diagram showing application of improved d-c high potential test to a traction motor armature (at left).

Fig. 2—Characteristic oscilloscope patterns for various conditions of insulation (above).

D-C High-Potential Testing Has Been Improved

DURING THE PAST SEVERAL YEARS, d-c high-potential testing has gained considerable acceptance in railroad shops. An improved method (*Railway Locomotive and Cars, March 1958, p. 46*), promises to enhance the usefulness of this type of test. To appreciate its significance, let us first review present methods of insulation testing.

Two Present Methods

The a-c high-potential test is of the "go-or-no-go" type. The insulation either stands the test or breaks down. If it passes, the margin by which it passed is not known. If it fails, a portion is completely ruined and must be replaced. This is a crude device at best, since it gives no actual measurements of the insulation quality other than its ultimate strength at the end of the test.

An improvement is made when d-c megohmmeter tests are used in addition to the a-c high-potential test. Insulation resistance measurements can then be made, and useful data obtained. Safe limits of minimum insulation resistance can be determined for specific pieces of equipment. If resistance falls below this value, the machine can be cleaned and baked, and the resistance measured again. If it is still too low, a step-by-step check must be used to locate the trouble. Then suitable action can be taken for repairing the machine.

This article is written by V. N. Wheaton, Locomotive and Car Equipment Department General Electric Company, Erie, Pa.

While the megohmmeter gives a value of insulation resistance, neither the corresponding voltage nor the shape of the resistance-versus-voltage curve for the insulation are known. Recent discoveries have shown that both this curve and the leakage current-versus-voltage curve tell much about the insulation condition as regards moisture and dirt. Therefore, although both the d-c megohmmeter and a-c high potential tests are used, they furnish only a small part of the information needed to diagnose the insulation condition.

With the improved method of d-c high-potential testing mentioned above, an oscilloscope is used to indicate electrical discharges in the insulation before it breaks down, thus giving three means for judging insulation condition—oscilloscope pattern, leakage current characteristic, and absorption current characteristic. Hence, more accurate and complete information is obtained, and the danger of harming the insulation minimized.

Test Equipment and Procedure

The equipment consists primarily of an adjustable high-voltage d-c source instrumented to read test voltage and leakage current, and a cathode ray oscilloscope with a high-pass filter in its input. The oscilloscope is connected to show only the high-frequency discharges in the leakage-current measuring circuit.

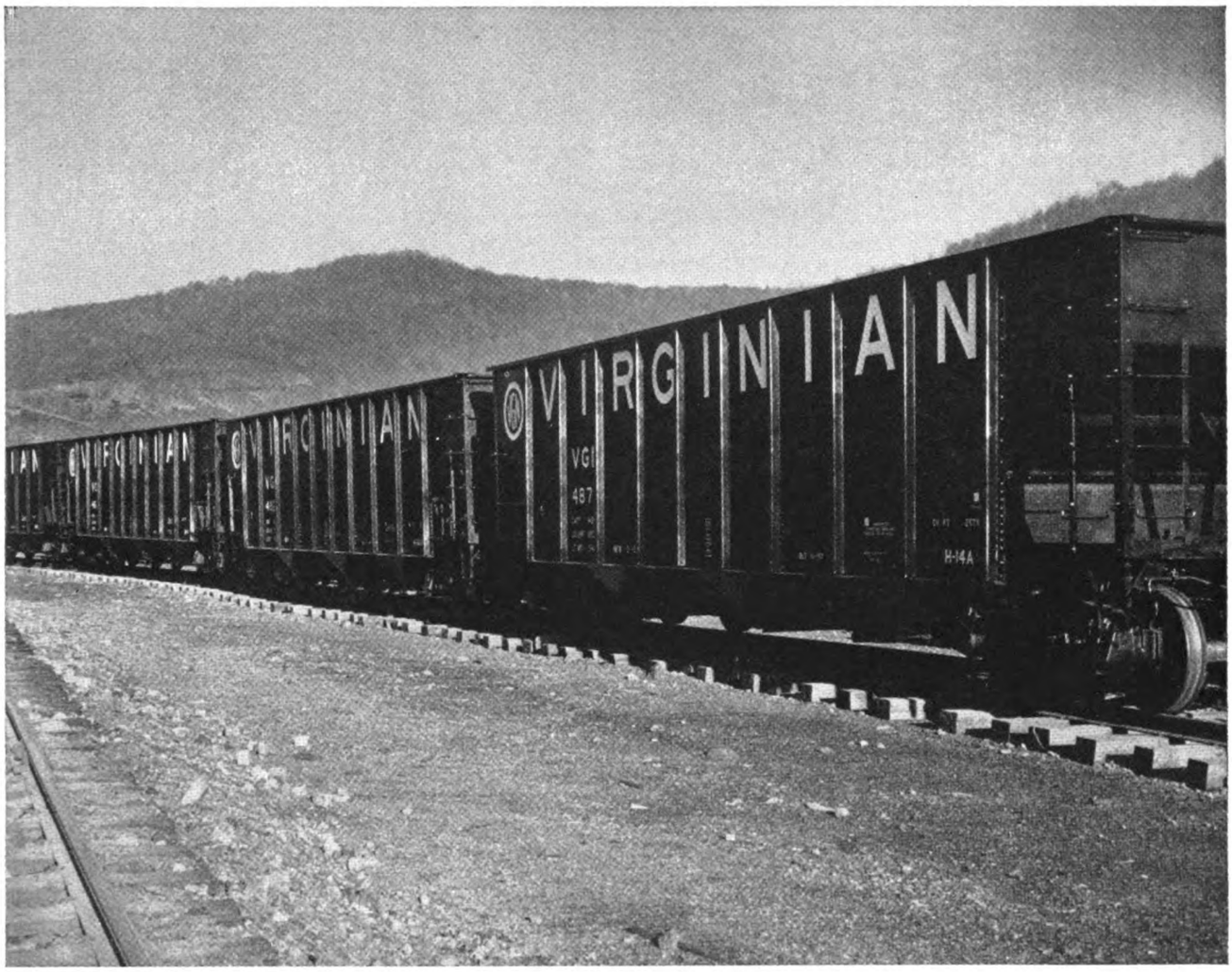
Because of the low current capacity required for d-c testing, the equipment is quite small and light compared to a high-potential test sets, and the cost correspondingly low.

The connections for testing (Fig. 1) are simple. A high-voltage lead from the instrument is attached to the machine terminals, brush holder or commutator. The shaft or frame is grounded to a common point with the instrument and the leakage current is measured in the return circuit inside the instrument. The input to the high-pass filter is connected across the current-measuring circuit in the instrument, and its output is connected to the vertical sweep of the oscilloscope.

Before the high-voltage source is turned on, the milliammeter is set to minimum sensitivity, and the oscilloscope controls are set at predetermined markings. With the voltage adjustment turned down all the way, the switch is closed. If the oscilloscope shows no discharge, and no excessive leakage currents are indicated, the voltage can be raised to a readable value. The milliammeter is then adjusted to the proper range setting.

Now the voltage is slowly raised to the value for the first 1-min. reading, watching the oscilloscope for evidence of discharge to prevent overstressing the insulation. Voltage steps are then taken at 1-min. intervals. These might be 200-volt steps if the desired maximum is 1,000 volts. Leakage current and voltage after one minute are recorded for each step, and the oscillo-

(*Continued on Page 52*)



Five Hundred *for the Virginian*

These new triple-hopper cars are part of the 500 built for the Virginian at Bethlehem's Johnstown, Pa., shops. Designed primarily for coal haulage, they will stand up under many years of hard service.

Nominal capacity of the cars is 70 tons. Bodies are of combination welded-and-riveted construction. To insure longer life, all plates in contact with the lading are corrosion-resistant steel. Running gear includes one-wear wrought-steel wheels and forged-steel axles.

Other major details include the following:

Length over coupler faces	43 ft 6 in.
Length inside	40 ft 0 in.
Width over bulbs	10 ft 6⅛ in.
Width inside	9 ft 9 in.
Height, rail to top of side	10 ft 8⅛ in.
Truck centers	31 ft 0 in.
Cubic capacity, level	2573 cu ft
Light weight	54,200 lb

Perhaps your own needs may call for a different type or size of car. Whatever your requirements, we are equipped to meet them in full. Give us your specifications—or, if you prefer, our engineers will be glad to design the car. In either event, the Bethlehem shops will follow through promptly with a first-class production job.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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screen watched for signs of discharges. Suppose these appear at about 75 per cent of the desired test voltage, this means trouble. One way to diagnose the trouble is to study the discharge pattern. This will show different conditions of insulation; (see Fig. 2). By proper use of this information the cause of the trouble may be determined. Moreover, observation of increasing discharges will give a warning so that the test can be stopped before reaching voltages that would damage the insulation.

The current and voltage values obtained above can be used to plot a leakage current characteristic. Various characteristic shapes of such curves are shown in Fig. 3. The test curve from a given machine is of value only when compared to a standard set of curves for that particular machine or set of machines.

If additional information, or a confirmation of results is desired, the dielectric absorption test can be made. This will be of special value during the introductory period of this test. Before starting the absorption test, the stored charges in the insulation should first be drained off by grounding the conductors under test for several minutes. The ground is then removed and the voltage quickly raised to a safe value established by the previous test. With the voltage held constant, current readings are taken at 1-min. intervals, beginning at the end of the first minute and extending for a period of 10 min.

In all but wet insulations, the leakage current will decrease over the 10 min period. The dryer and cleaner the insulation the higher will be the ratio of the 1-min to the 10-min current reading. This will range from 2.5 to 4, or higher. If the insulation is very wet the ratio will be unity for all voltages; see Fig. 4.

Temperature also has a marked effect on the leakage current characteristic. If the machine is hot the leakage current will be much higher than if the windings are at room temperature. To avoid errors from temperature change in the windings, readings should be taken with the insulation at or as near to room temperature as possible.

Use in Shops

The use of this improved d-c test method in the running maintenance shop will be considered first. Here the ability to distinguish between wet and dirty insulation places it well ahead of the time-honored megohmmeter and a-c high-potential method.

The leakage current test is made first, observing the oscilloscope as already described. This may be followed by the absorption current test. The results of these two tests will show whether the insulation is wet or dirty. If wet, it can sometimes be dried out by running the engine and blowers. The leakage current test can then be repeated to see if passing warm shop air through the machines has effected any improvement.

Remember that the condition of creepage surfaces, such as brush-holder insulators, string bands and end windings is very important to these tests. Probably no test method can tell whether the water or dirt is on accessible creepage surfaces or on creepage surfaces in inaccessible locations. Therefore, if the leakage current test shows low insulation resistance, all accessible creepage surfaces should be cleaned and dried before attempting to proceed further. After this has been done, the condition of the conductor insulation can be analyzed in the manner already described.

A different situation exists in the back shop. Here it is not a question of whether equipment should be pulled out of service, but of whether it should be completely rebuilt or simply put into good running condition until rebuilding is necessary. Over the years a logical procedure has been built up that is generally followed. Before removing the armature the machine is given an insulation resistance test for grounds or very low resistance spots. After removing the armature the entire machine is thoroughly cleaned and baked dry. It is then given another d-c insulation test and, if satisfactory, an a-c high-potential test. If it passes, it is usually dipped in varnish and baked again. Another high-potential test is then given and the machine is ready for service.

A step-by-step examination of this procedure will show where the improved d-c high-potential test method may be used to advantage. If the megohmmeter shows low resistance in the first check; the d-c test will show the same, and also indicate whether the trouble is water or a possible combination of dirt and weak insulation. If water is indicated, cleaning and baking are in order, followed by another d-c high-potential test. This time an even better picture of the insulation condition is obtained because the effects of water and dirt have been eliminated.

If cleaning and baking do not raise the resistance enough, the insulation is presumed to be bad. It must then be stripped out. On the other hand, if the test shows that the insulation is usable, the machine can be dipped and baked. After cooling, it is given another d-c high-potential test and the results recorded for future use. By comparing these records whenever the machine comes in again, and observing their general trends, potential trouble undetected by individual tests may be spotted.

Mention has been made of plotting curves. While a railroad shop is obviously not a laboratory, these curves should be obtained if at all possible—especially at the outset of a testing program. Perhaps the engineering office

(*Continued on page 54*)

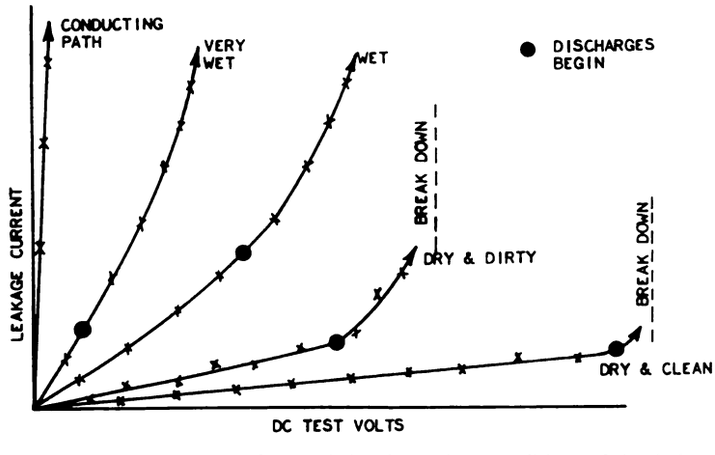

Fig. 3—Leakage current characteristics for various conditions of insulation.

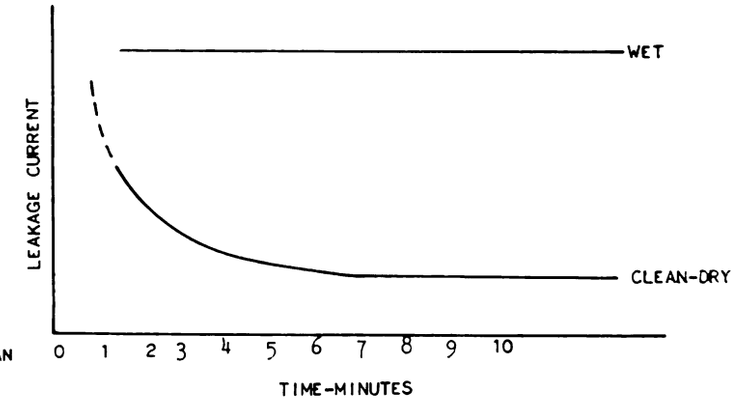

Fig. 4—Dielectric absorption characteristics for clean-dry and thorougly wet insulation.

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following the program can later set up a simple procedure with forms that will give the desired information and yet require a minimum of time and special instruction to use. After enough experience has been gained to assure proper understanding of the results, the procedure can probably be simplified, particularly in the matter of curve plotting.

However, the fact should be kept in mind that the inherent advantage of d-c high-potential testing is that it furnishes different types of data on the insulation system. Each type contributes its share to the final diagnosis of the insulation condition. If the tests are simplified too much, all or most of this superiority will be lost.

Future Possibilities

While d-c high-potential testing techniques are not yet perfected, it is recognized by both the ICC and AAR as a permissible substitute for a-c in standard over-potential tests. A great amount of study remains to be made; but this improved method appears to be a more complete tool for diagnosing [in]sulation condition than any previou[s] available. It will not eliminate the n[eed] for sound judgment; neither will it ha[ve] any revolutionary effect on railro[ad] procedures; but it may well prove to [be] a big factor in reducing road failur[es]. The railroads themselves are in the be[st] position to develop and apply this te[st]ing method to their own equipme[nt]. Help, as needed, can be obtained fr[om] various sources, including their own re[-] search groups and the manufacturers [of] traction equipment.

From the Diesel Maintainer's Note Book

The Diesel Seemed to Be Starved for Fuel

By Gordon Taylor

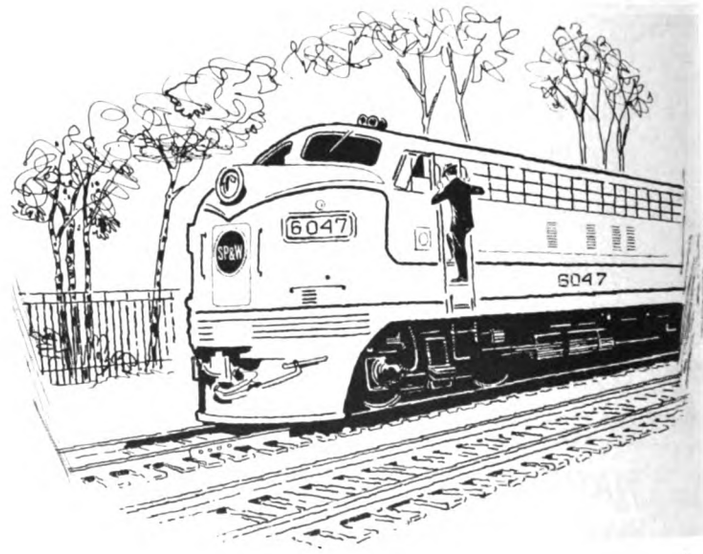
The road foreman was about to wind up a busy day by riding a two-unit passenger diesel to his home terminal. As he approached the locomotive standing in the station, he heard an engine that seemed to be slowing down and running at irregular speeds.

He hurriedly boarded the unit, thinking that something had caused the *PC* switch to trip and stop the fuel pump. He found that the *PC* switch was okay, and that the fuel pump was running. A glance at the five-lb fuel sight glass convinced hi mthat lack of fuel was not causing the trouble. Yet one of the engines was running slowly in an irregular manner and was noisy in its operation.

Being unable to locate the cause of trouble, and thinking there were some bad valves in the engine, the foreman very properly shut the engine down. Since no other unit was available, the locomotive was dispatched with one engine shut down. Fortunately, the train could be handled by two units, with only three engines working.

Arrangement was made to cut in a relief unit at a distant terminal so that the engine trouble could be located and repaired.

When the failed unit arrived at the repair point, the engine was cold, having been shut down about 14 hours, so there was nothing that could be done immediately except to make a careful



inspection by barring the engine over by hand, and making blow-by tests to see if there were any bad valves, etc.

In making visual inspection, the diesel supervisor noticed that the overspeed trip reset lever indicated that it had tripped about half-way. Instead of the reset lever being inclined at an angle, it pointed in a vertical position, which showed that the trip shaft cams had not been able to completely lift the injector rocker arm rollers from the cam shaft. In the condition described, the overspeed trip could not completely prevent fuel injection and stop the engine.

As a result of the half-tripped position, the engine was receiving a limited amount of fuel, which explained the reason that the road foreman thought it must be starving for fuel. This also explained the unusual sound of the engine.

The cause of the semi-tripped condition of overspeed trip was apparently due to two things: First—one of the injector rocker arm pawls (one is located at the top of each cylinder, under the deck cover) had its latch bent so that it could not be properly set; second—the large coil spring that actuates the overspeed trip mechanism had become weakened to the extent that it did not exert enough pressure to throw the trip shaft throuhg its full travel. When these parts were replaced everything was okay.

From this it would appear that if an engine seems to be starving for fuel and the fuel pump is operating with fuel in the sight glass, it is necessary to get back in business.

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

ational MF-400 Rubber-Cushioned Draft Gears have a rated capacity of 42,500 foot-pounds us a 54 per cent reserve capacity—a *total of 65,500 foot-pounds*. This ample reserve ves your cars protection when they need it most—at high impacting speeds. And, during gular road operations, the MF-400 provides excellent protection against severe ock due to run-in and run-out of slack.

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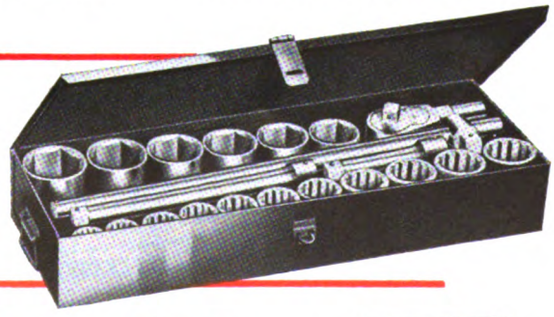

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Shipper Group Suggestions May Affect Car Designs

Advantages and standardization of cargo c tainers or demountable trailer bodies handling dry and refrigerated cargo covered in a report issued following a months study by a joint industry and car group. The New York Central and Un Pacific have just received piggyback equ ment which involves demountable trai bodies (pages 38 and 39, this issue).

At the same time a spokesman for gypsum industry has given details of the cars which have been found to handle gyps products to best advantage.

Recommendations of the joint group cargo containers include the following: Stan ard width—96 in.; standard height—96 102 in.; lengths—10 ft, 11 ft 6 in., 17 ft, 24 and 35 ft. The containers should be capa of being handled on and transferred betwe highway, water and rail carriers. They shou be designed to be stacked two high.

Securement should involve two-point down, automatic locking and unlocking at t shipping position, locking mechanisms capab of withstanding 7G horizontal and vertic accelerations, and locking device desig which can be applied to existing equipmen

The study group was composed of repr sentatives of Minnesota Mining & Manufa turing, Clark Equipment, Reynolds Meta Electro-Motive Division, Spector-Midstat Freight System, Browning Steamship, Sla Airways, Rail-Trailer Co., and the Rock I land. This group was impressed by the almo universal interest shown in shipping containe

The participating companies will contin their efforts and work in developing a stan dard shipping container which can be a vantageously handled by all different typ of transportation systems.

Bulkhead Flat Car Specifications

The Gypsum Association Traffic Comm tee's objective was to determine the ideal fl car based on field experience with more tha 700 special cars now in use.

The recommendations include (1) cars wi 48-ft 6-in. spacing between bulkheads, (protective bulkheads at each end of car wi a minimum height of 78-in., (3) car flo and bulkhead width of 10 ft with the bul heads wood faced with a minimum of 2-i material and with all fastenings countersun (4) wood flooring capable of supporting 15 000 lb lift trucks, (5) fixed anchor devic recessed in the car floor, and (6) a speci compartment behind one bulkhead with capacity of 60 to 70 cu ft and reasonab weatherproof.

Shipments of wallboard on well-design flat cars with bulkheads average 80,000 per car compared to 50,000 lb per car wh the material moves in box cars, the gypsu group stated.

Train Brake Act Passes

First railroad legislation enacted by t present session of Congress and signed the President is the controversial train bra act. Opposed by railroads and recommend by the ICC, this law gives the commiss power to prescribe rules for inspection, te ing and maintenance of train brakes. Th Commission first made this recommendat in its 1956 Annual Report.

PROBLEM PAGE

SHOULD FLASHED MOTORS BE REMOVED?

Should the extent of a traction motor flashover determine whether it is cleaned up in place under the locomotive, or should the motor always be removed? If the practice of cleaning in place is used, what is looked for to determine if this will be done, and how can the locomotive be moved to rotate the armature and permit inspection and cleaning of the entire commutator?

ENGINE SPOTTER DOES A JOB, *by W. A. Kresge, general superintendent, Pittsburgh & West Virginia, Pittsburgh.* We do clean up the flashed motor in place if, upon inspection, the flash is not too severe. The electrician holds the stone in place and locomotive is moved so that the flashed section can be cleaned of beading, etc. We use the Whiting engine spotter for this work. Its length of travel is more than sufficient for one revolution of the motor and it does an admirable job; not too fast and actually not too slow either. It must be borne in mind that a flash-over which can be repaired in this manner has not been too severe, but perhaps 30 or 40 per cent of all flash-overs fall in this category. After the flash-over has been cleaned up in this manner we paint the necessary portion of the motor with Glyptal, also using the Whiting engine spotter to move the locomotive. [*The P&WV uses a Whiting engine spotter originally purchased for setting its steam locomotive valves.—Editor.*]

ROTATING WITH A WELDING MACHINE *by Supervisor, Western railroad.* Sometimes traction motors are cleaned up in place under the locomotive and continued in service. This is done by stoning the commutator, cleaning the brush holders and applying new brushes.

The amount of work which can be done "in place" depends upon the extent of the damage from the flash. When the motors are cleaned up in place, it is our practice to rotate them by using current from an electric welding machine. The axle involved is raised so that wheels clear the rail, or the locomotive is moved to a section of track which has gaps cut out of the rail heads so that the motor can rotate the axle freely.

NOT OUT EVERY TIME *by L. E. Legg, Electrical Engineer—Equipment, Chicago & North Western, Chicago.* A traction motor should not be removed from a locomotive because it has had a flashover.

Nearly every traction motor shows some signs of flashover any time it is opened for inspection. Unless the flashover has been intense and has done a great deal of physical damage, a motor can usually be cleaned up and returned to service with a small amount of labor. Usually a flashover leaves a burr around the edge of the commutator and this can be dressed off with a file and sandpaper. The string band is usually found to be smoked up and this can be cleaned with alcohol. Brush holders can be cleaned this way.

The string band always should be inspected carefully after a flashover. Any damage to it can, in most cases, be repaired by painting with a heavy coat of Glyptal.

The complete circumference of the commutator is accessible by removing all the covers. However, if it is more convenient for the electrician to work on it from a certain location, the armature can, of course, be turned by moving the locomotive either under its own power or with another locomotive.

MOISTURE IN COMPRESSED AIR SYSTEMS

What can be done to eliminate the moisture contained in the compressed air delivered to the bell ringers and sand traps of diesel locomotives, or what can be done to prevent failures of these devices that are caused by this moisture?

MOUNT THE BELL HIGH *by V. L. Smith, Superintendent of Motive Power, Belt Railway of Chicago.* The practice on this Railway which operates under the weather conditions which prevail in the Chicago area, is as follows:

1. We have equipped nearly all locomotives with automatic air reservoir drain valves which operate each time air compressor loads or unloads. This device has proven very successful. Air reservoirs are also drained manually each day when the locomotive arrives at its inspection point.
2. We have mounted the bells high up on the locomotive hood, and while this places the bell in an exposed location, it has the advantage of making it so that moisture cannot drain downwards to the bell as it did when the bell was located below the frame.
3. We have received improved performance in the cartridge-type bell ringer mechanisms by using the special bell-ringer grease recommended by the manufacturer.
4. We have had no trouble whatsoever with freezing of air at sand traps. We do have plugging of sand pipes adjacent to the rail caused by moisture or snow thrown up by the wheels.

Belt Railway of Chicago hangs bell high on hood of this GP unit.

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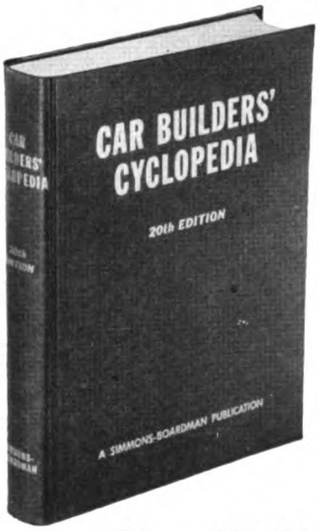

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Personal Mention

(*Continued from page 14*)

gineer of standards and methods, succeeding Mr. Haney. Formerly assistant to engineer of car equipment.

Charleston & Western Carolina.—*Augusta, Ga.:* J. W. FLOWERS, superintendent, has assumed general supervision over transportation, mechanical and roadway departments, following the retirement of R. W. MARYE, general manager. Latter position abolished.

Chicago, Milwaukee, St. Paul & Pacific.—*Milwaukee:* A. W. HALLENBERG, appointed district master mechanic, succeeding A. M. HAGEN, retired. *Chicago:* W. C. GAGE appointed division master mechanic, succeeding Mr. Hallenberg. *Savanna, Ill.:* D. A. RADABAUGH appointed master mechanic, succeeding W. W. HENDERSON, retired. Formerly general foreman at Tacoma, Wash.

Chicago & North Western.—*Chicago:* D. R. WHITENIGHT, JR., appointed mechanical inspector—car. *Clinton, Iowa:* VITO FILITTI appointed assistant chief mechanical engineer.

Missouri Pacific.—*Dupo, Ill.:* M. H. LOSCH, master mechanic, retired.

New York Central.—*Collinwood, Ohio:* GORDON L. ZEIDER appointed superintendent, diesel locomotive shop, succeeding I. W. MARTIN, retired. *New York:* ROBERT W MUSTARD appointed mechanical superintendent. Formerly master mechanic, Collinwood, Ohio.

Southern.—*Charleston, S. C.:* WILBUR D. SHULTS appointed master mechanic. *Alexandria, Va.:* GEORGE V. STRAYHORNE appointed master mechanic, succeeding Mr. Shults. *Knoxville, Tenn.:* DAVID W. PIPPINGER appointed general foreman at Coster Shop, succeeding Mr. Strayhorne. *Spartanburg, S. C.:* CHARLES E. SHAW appointed tools and methods engineer at Hayne Shop, succeeding Mr. Pippinger.

Supply Trade Notes

ALCO PRODUCTS, INC.—*Stanley E. Lodge*, director of training programs since 1955, has left for Sidney, Australia, where he will work with the *A. E. Goodwin Company*, Alco's licensee, in the expansion of its diesel-locomotive manufacturing operations. Mr. Lodge, who taught diesel-locomotive operation and maintenance at the former Alco school for 11 years, expects to be located in India as Alco's Middle East representative upon completion of his Australian assignment.

■

NATIONAL MALLEABLE & STEEL CASTINGS CO.—*Wilson H. Moriarty*, first vice-president, has been appointed also chief executive officer of the newly formed Railway and Mine Division. This division in-

(*Continued on page 58*)

How much can you save? Use this table and find out!

This table, based on a fleet of 100 diesel and electric units, will aid you in figuring how much Standard's Wheel Truing Machine could save you.

WHEEL TRUING MACHINE SAVINGS ANALYSIS

AVERAGE 100 UNIT FLEET

Total pairs of wheels in Service	432
Average mileage 1 unit 1 month	9,500
Average mileage between wheel turnings	57,000

DIRECT SAVINGS	Lathe Method	Wheel Truing Method
Wheel pairs changed annually	736	164
Wheel Turnings per wheel life	2.5	3.5
Wheel pairs turned annually	526	572
Labor and Tooling cost per pair wheels turned	$73	$14
Total Annual Cost	$38,398	$8,008
SAVINGS	$30,390	
New Wheels purchased annually	210	164
New Wheel Cost @ $368	$77,280	$60,352
SAVINGS	$16,928	
TOTAL DIRECT ANNUAL SAVINGS		**$47,318**

MAJOR INVENTORY REDUCTION	Lathe Method	Wheel Truing Method
Wheel, Axle & Bearing Assemblies		
No. wheels changed annually	736	164
Minimum Inventory—30 day supply	61	14
Value @ $2,145 each	$130,845	$30,030
INVENTORY REDUCTION		**$100,815**

Our representatives will supply facts behind these and other studies. For immediate information, write to: WHEEL TRUING, Standard Railway Equipment, 200 South Michigan Avenue, Chicago 4, Illinois.

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cludes plants at Sharon, Pa., and Melrose Park, Ill.; the Technical Center in Cleveland, and International Operations. *Stowell C. Wasson,* corporate vice-president, is responsible for various staff services, including metallurgical research and process development. *B. C. Yearley,* who is associated with Mr. Wasson, will be assistant vice-president. Other officers of the division are *Mellor W. Stevenson,* vice-president, sales; *Kenneth Selby,* vice-president, engineering, and *John F. Hutson,* assistant vice-president, sales, Chicago.

■

GENERAL ELECTRIC COMPANY.—Facilities for completely overhauling and rebuilding industrial locomotives of up to 120 tons and 1,000 hp have been set up at New York, Pittsburgh, Cleveland, Dallas, San Francisco, Atlanta, Salt Lake City, Boston, Chicago, Minneapolis, and Portland, Ore. In 37 additional cities, other GE service shops are equipped for some phase of locomotive repair or inspection, although, in the smaller shops, this may be limited to emergency field work. The major repair centers can complete a locomotive overhaul in four to six weeks, according to Howard F. McCullough, manager of GE's Service Shop Department, who announced the opening of the service on April 10. Doubling the useful life of the locomotive, the overhaul is said to cost only 20 to 40 per cent as much as a new locomotive of the same size and horsepower rating.

■

DEVILBISS COMPANY. — Northeastern headquarters have been moved from Newark to a new building at 10 Stern avenue, Springfield, N.J. The new branch has more than 11,000 sq. ft of floor space. It includes a testing and demonstration area, repair, rebuilding and exchange center, and sales, engineering and administrative offices for DeVilbiss and its newly acquired subsidiary, Newcomb-Detroit Company (now *Newcomb-DeVilbiss Company*), designers and manufacturers of industrial finishing equipment. *C. B. Gracely,* Northeastern Regional sales manager, is in charge. The Milwaukee sales office of Devilbiss has been moved from 833 East Kilbourne avenue to 6915 West Capitol Drive.

■

AIR REDUCTION COMPANY, AIR REDUCTION SALES COMPANY DIVISION. — *N. F. Moody* has been appointed district manager at Philadelphia, and *H. F. Colt, Jr.,* district manager at Boston.

■

LINDE COMPANY. *Robert H. Bennewitz,* southwestern region manager of engineering service at Kansas City, Mo., has been appointed assistant manager, railroad department, at Chicago.

WESTINGHOUSE AIR BRAKE COMPANY, AIR BRAKE DIVISION.—*C. F. Hammer,* director of engineering, has been appointed vice-president—engineering.

■

ACF INDUSTRIES, AMERICAN CAR & FOUNDRY DIVISION.—*Charles F. Venrick,* vice-president, western region, has been appointed vice-president in charge of railway sales, with headquarters in Chicago.

■

E. R. Hauer

SPERRY RAIL SERVICE.—*E. R. Hauer* has been appointed consultant on railroad applications of ultrasonic testing. Mr. Hauer recently retired as general mechanical engineer of the Chesapeake & Ohio. *Richard Neiley* has been appointed district sales supervisor, with headquarters in Chicago.

■

WAUGH EQUIPMENT COMPANY-EVANS PRODUCTS COMPANY.—Manufacturing and sales rights and patents *Southern Pacific's* "Hydra-Cushion Underframe" for freight cars have been sold to the Waugh Equipment Company of New York and the Evans Products Company of Plymouth, Mich., who will jointly manufacture and sell the device.

■

AMERICAN AIR FILTER COMPANY-*William Peters* has been appointed manager of the New York City branch office. Mr. Peters was formerly assistant general sales manager of the Anemostat Corporation.

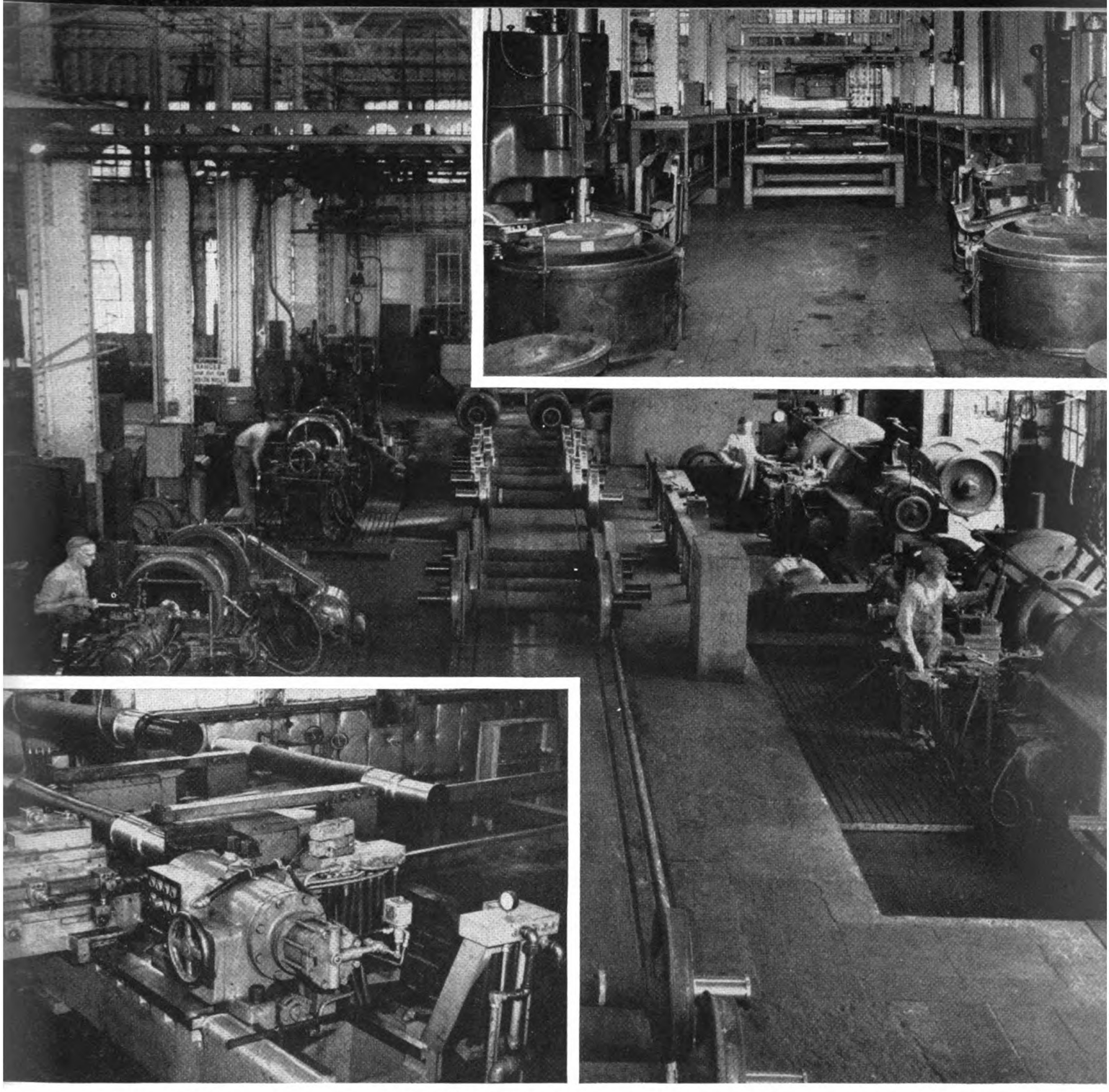
■

SHERWIN-WILLIAMS COMPANY.—*Gordon K. Sell* has been appointed transportation representative in the Philadelphia area, succeeding *George E. Smith,* retired. Mr. Shell, who was previously technical coordinator, transportation division, will be located at 325 North Broad street, Philadelphia.

■

DUFF-NORTON COMPANY.—*T. B. Pearson* has been appointed district sales manager for the Duff-Norton Jack Division and the Coffing Hoist Division in northern Ohio.

(Continued on page 60)



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Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools

WHO'S WHO IN BRUSHES . . .

BIOGRAPHICAL EXCERPTS OF CERTAIN WELL-KNOWN DIESEL-ELECTRIC BRUSH PERSONALITIES YOU MIGHT LIKE TO MEET . . . *and some you wouldn't*

WEAREVER McHARD

Old Wearever has been fighting it out with commutators ever since he was knee high. Fact is, he hates 'em like poison because his pappy taught him long ago that it was either their hides or his'n. Wearever's durability is clearly attested by the fact that he is still living lustily . . . whereas a lot of commutators with which he has been associated have been laid up for extensive hospitalization. Old Wearever is as hard as they come. He's got grit, too. In fact, some folks claim he'd have more friends if he softened up a bit, acquired a little humility and learned to cooperate with commutators instead of battling 'em.

JUSTA SOFTIE

Justa would have a better reputation if she wasn't such a pushover . . . for commutators, that is. No one ever told her that even perfectly well-bred commutators might be quick to take advantage of a weakness like that. Poor Justa! Not very strong to begin with, she tries to be so accommodating that, just when her affairs ought to be whirling smoothly along, she's apt to be plumb worn out. Of course she can be replaced, but some diesel men rightfully complain that this is a lot of unnecessary bother . . . and expensive besides.

THE STACKPOLE BRUSH FAMILY

The word "adaptable" best describes this rather remarkable clan. Take ole Uncle Happy Medium Stackpole, for instance. He's hard but not too hard, soft but not too soft. For years, he's been a kissin' neighbor to a whole flock of commutators. Gets along with 'em smooth as molasses. Quicker'n you can say "no bar-burning," he flips a film on commutator surfaces. What's more, he keeps it there over long mileage schedules and under mighty trying conditions. No need for frequent and costly commutator "reconditioning" when he's on the job. That's why Uncle Happy is honorary president of S.P.C.C. which, in case you've forgotten, is the Society for Prevention of Cruelty to Commutators. Uncle Happy's pretty proud of his achievement. So are we!

STACKPOLE
diesel-electric
BRUSHES

STACKPOLE CARBON COMPANY • *St. Marys, Pa.*

fornia, Nevada, Oregon, Washington western Idaho, with headquarters in Francisco. *Donald A. Anderson* has bee pointed district sales manager, covering York State and New England.

■

AMERICAN HOIST & DERRICK C PANY.—*Richard J. Mills*, regional mana Eastern district, has been appointed ge sales manager.

■

K. W. BATTERY COMPANY.—*Robert Rinehart*, midwest regional sales manager. been appointed eastern regional sales m ager. *Donald R. Wickman* has been appoi sales representative for KW batteries in w ern Pennsylvania, West Virginia, southeas Ohio, and part of Maryland, with he quarters in Pittsburgh.

■

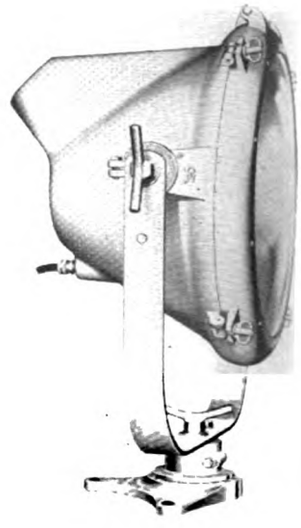
DAYTON RUBBER COMPANY.—*Rob G. Burson* has been appointed assistant g eral sales manager, Mechanical Goods vision.

■

WILSON ENGINEERING CORPORATIO —*John T. Hultgren* has been appointed r road representative in the Twin Cities a Duluth areas.

What's New

(*Continued from page 18*)



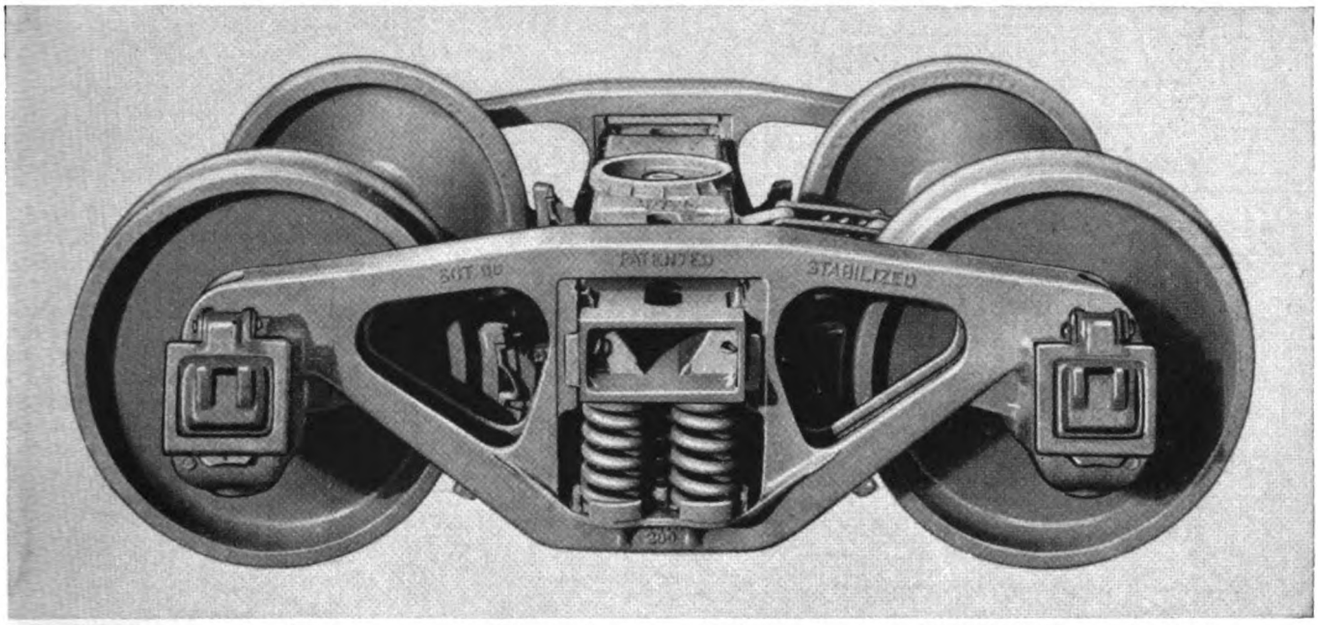
Mercury Vapor Floodlights

These heavy duty, cast aluminum floodli housings are designed especially for metal vapor lamps. They have the same dust- moisture-proof characteristics as the in descent models and are available in sizes a 10-in. model for 250-watt lamps or 20 and 23-in. housings for 700 and watt mercury vapor lamps. Models are a able with two types of reflectors and to five types of lenses.

Because of the voltages encountered mercury vapor lamps, the porcelain

(*Continued on page 62*)

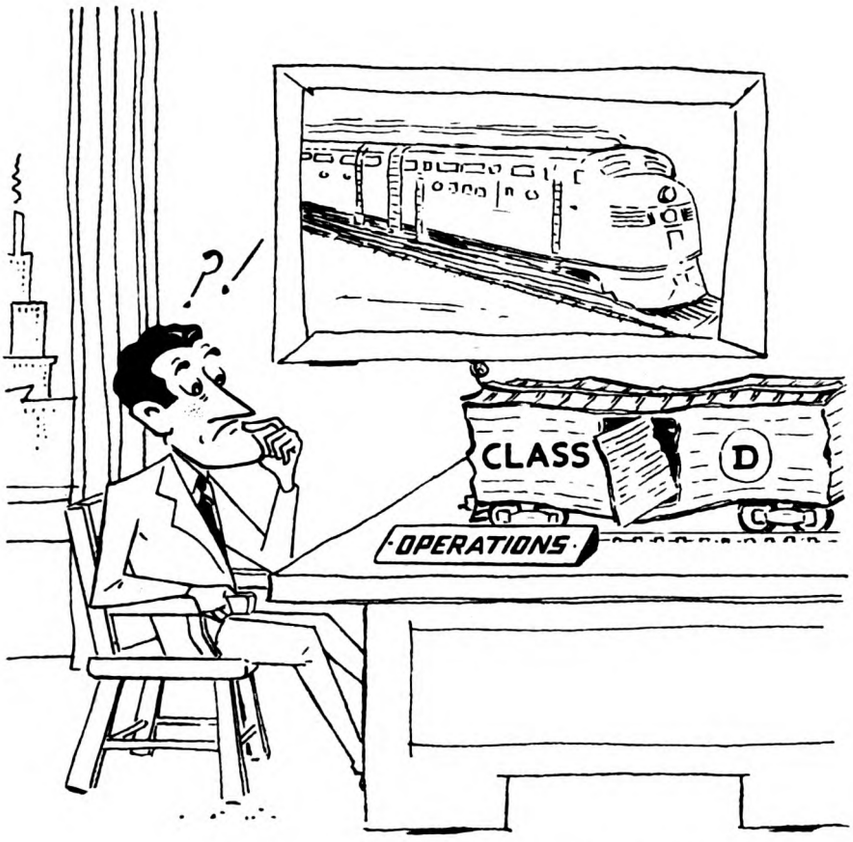
MODERN FREIGHT CARS BEGIN WITH



BARBER STABILIZED TRUCKS

MORE THAN 475,000 CAR SETS OF SM-O-O-O-O-THER RIDING BARBER STABILIZED TRUCKS SOLD

Standard Car Truck Company, 332 S. Michigan Ave., Chicago 4, Illinois.
In Canada: Consolidated Equipment Company, Ltd., Montreal 2, Quebec.



For the car "too-humped-to-help", most any upgrading is too costly. But where B and C cars must be made Class A and funds are limited, PLASTINAIL offers this:

1 — A super-smooth Class A floor

2 — That will outlast a new wood floor and remain in Class A service virtually all its life

3 — At as little as 2/3 the cost* of new wood.

*PLASTINAIL for ¾" coverage of a 40'-6" box car is only $138.

Installation time: approximately 20 man-hours.

Write, wire or phone for details

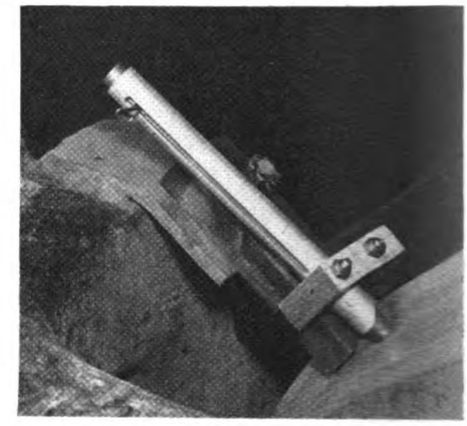
Plastinail*

OXYCHLORIDE CEMENT BOX CAR FLOORS

*Reg. T. M. of F. E. Schundler & Co., Inc.

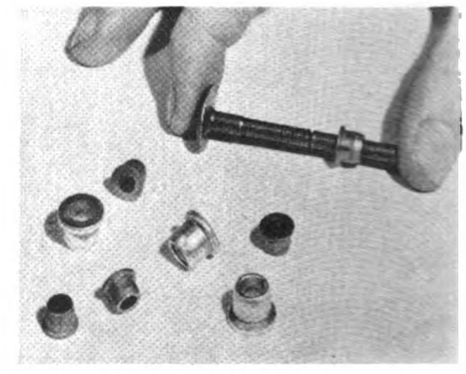
F. E. SCHUNDLER & CO., INC., 504 Railroad St., Joliet, Ill.

receptacle cuts out automatically during lamp replacement, removing voltage from the exposed socket. Cords, when provided, are three-conductor type to permit grounding. *Pyle-National Company, Dept. RLC, 1334 N. Kostner ave., Chicago 51.*



Flange Lubricator

The Nalco improved flange lubricator, type TA, features a swivel mounting eliminating clearance problems and permits replacement of the dry molybdenum disulphide stick lubricant without removal of any part. According to the manufacturer, there is no interference with application of new brake shoes from top wheel position. Adjustment of guide shoe is simplified and positive, and the suspension mounting prevents grabbing, chaffing, and applies lubricant smoothly and uniformly. *National Aluminate Corporation, Dept. RLC, 6216 West 66th place, Chicago 38.*



Huckbolt Collar

A flange-type collar for use with Huckbolt fasteners permits its use in over-size hole applications.

The 3LC collar also provides improved bearing in wood-to-metal, and wood-to-fiber applications. The flange eliminates any tendency to overswage during installation and prevents crushing, extruding, or deforming of the surfaces being joined. The new collar design is installed with standard Huck power tools.

(Continued on page 64)

Here's a NEW WELDING TORCH that's WATERTIGHT... built for HEAVY-DUTY SERVICE ...yet weighs only 7 OUNCES!

This new HELIARC HW-18 Hand Welding Torch weighs only 7 ounces, making it easy for you to handle, less tiring. The special one-piece water cooling channel eliminates sources of leakage. And it's made for rugged, heavy-duty service.

YOU GET BETTER SHIELDING WITH LESS GAS

Improved design of collet body and closer electrode fit assure uniform argon flow, without jetting or turbulence.

◀ Diagram shows leakproof, one-piece water cooling passage in LINDE's new HELIARC HW-18 Hand Welding Torch.

GIVES YOU RUGGED SERVICE

Torch body is Fiberglas-reinforced phenolic for greater resistance to heat and thermal shock. Handle is tough, polished plastic. Gas cups have 4 times the impact strength of ordinary cups.

LEAKPROOF

Molded, one-piece water cooling passage has no joints to permit leakage—no water drip to contaminate welds.

EASY, MORE ECONOMICAL MAINTENANCE

Collets, collet bodies, cups and caps are interchangeable with those of your HW-17 Series 2 Torch. All couplings have standard IAA connections, and adaptors are included. Your production costs are lowered, too, for the new HW-18 saves time in hard-to-reach spots. Torch is designed for continuous 300-amp service, a-c or d-c.

ARGON SHUT-OFF VALVE

(Optional) saves time, steps and argon.

For the best in electric welding ...look to LINDE

RAILROAD DEPARTMENT

Linde TRADE-MARK

UNION CARBIDE

The terms "Heliarc," "Linde," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

See and try the new HELIARC HW-18 Torch! Call your LINDE representative today, or write: Railroad Department, LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. In Canada: Linde Company, Division of Union Carbide Canada Limited.

Oakite Mechanized Methods force cleaning costs ...DOWN ...DOWN ...DOWN

... gives you the important advantage ...

low-cost end results

If your cleaning practices have kept pace with modern motive power, it's certain they're mechanized. Why? Well, one road spent $5,200 to clean 135 tank cars manually. When they mechanized the job with an Oakite 324 Cleaning Unit, they got faster turnaround, used less material, *saved $1,600.*

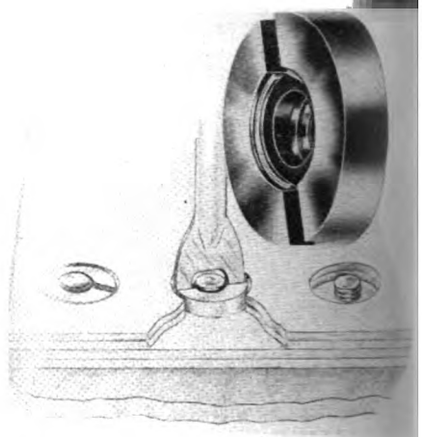
Latest materials help, too. A road saved $2,600 *a month* in car-washing costs by up-dating with Oakite Compound No. 88. *And,* they got better, non-streak cleaning ... on windows, too.

At one terminal, an Oakite Steam Detergent Gun and Composition No. 72 slashed monthly consumption of material for cleaning diesel interiors from 1,200 pounds to 337 pounds, cut *cost* per month from $144 to $57.63.

Beginning to suspect that a review of your cleaning methods and materials could save you money? Then call in the local Oakite man. Or, write for the Oakite *Manual of Railroad Maintenance Cleaning Procedures.* Oakite Products, Inc., 46 Rector Street, New York 6, N. Y.

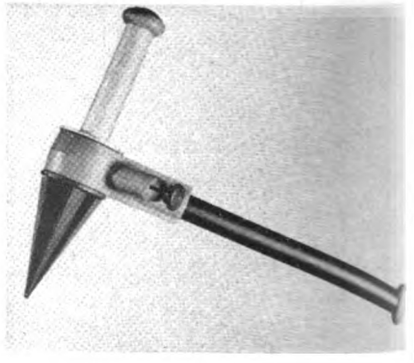
SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE
SCIENCE
In our 50th year

It covers a range of sizes for use wi... 3/16-in., 17/64-in., 5/16-in., 3/8-in., and ... nominal Huckbolt pin diameters. Flan... diameters for these sizes are 3/8 to 1 i... *Huck Manufacturing Company, Dept. RLC, 2480 Bellevue ave., Detroit 7.*



Self-Locking Panel Nut

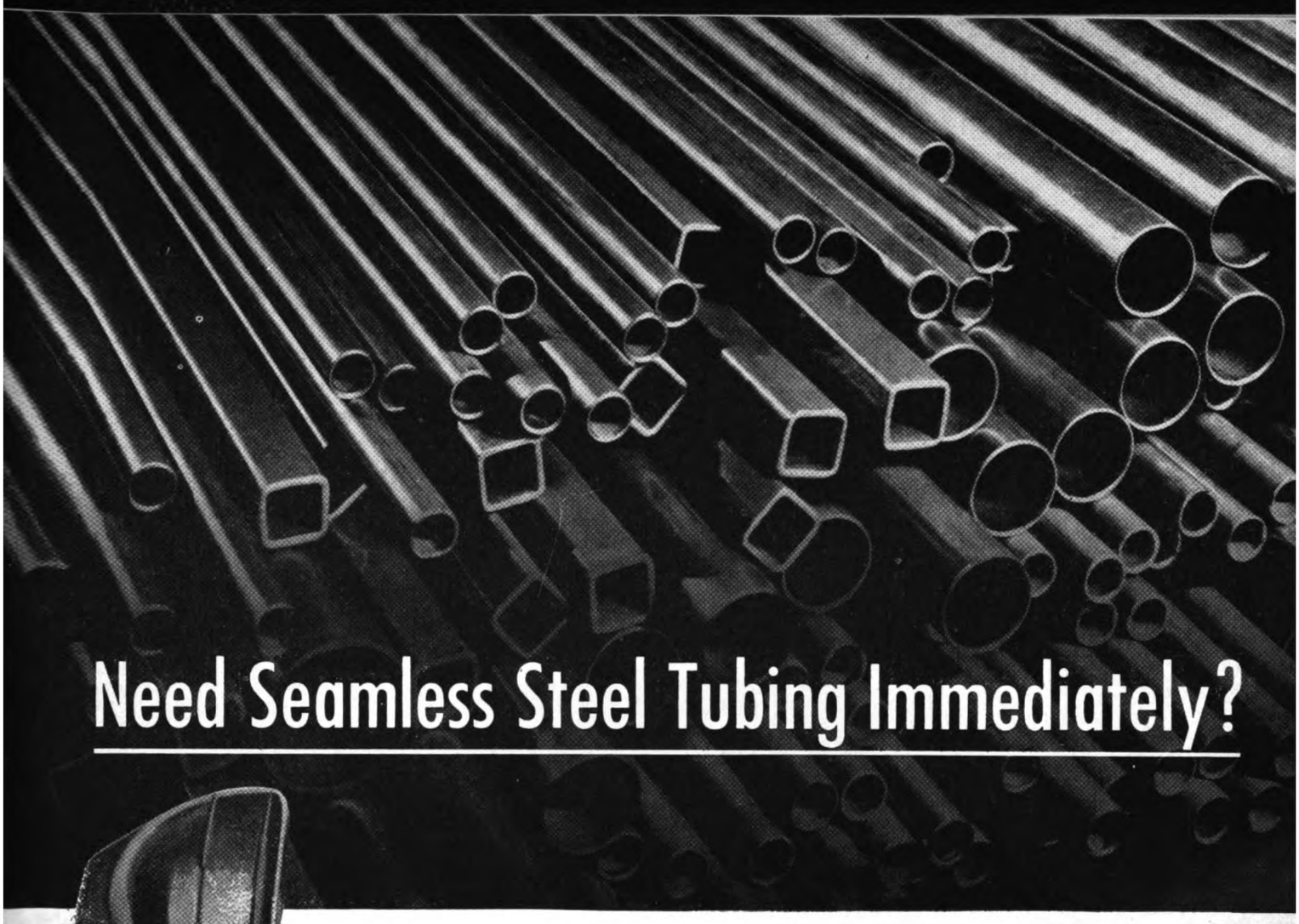
This self-locking nut, designed to simplify in... stallation, replacement and maintenance of interior wooden panels in freight cars, mounts flush with the panel surface. The ESNA panel nut can be installed or removed by using a standard double-bladed screw-driver type tool in a hand power unit. The blades of the screw driver tool fit the .125-in. wide slots in the face of the nut and provide the wrenching action. The nylon locking insert keeps the panel nut from loosening on the bolt despite possible loss of bolt tension due to shrinkage or compression of the wood panels. It also holds the fastener in place under the most severe vibration conditions. The Type 30... fastener can be reused and is made of carbon steel with 3/8-16 threads. It is 1-in. in diameter and .265-in. thick. *Elastic Stop Nut Corporation of America, Dept. RLC, 25... Vauxhall Rd., Union, N. J.*



Ratchet Reamer

Ratchet pipe reamer No. 182 is said to be especially effective for small pipe. Its 7-flute arrangement is designed for faster reaming while at the same time eliminating gouging

(*Continued on page 66*)



Need Seamless Steel Tubing Immediately?

Get "out-of-stock" delivery Call your USS Shelby Seamless Distributor!

WHY WAIT FOR DELIVERY when you can get all the top-quality Seamless Steel Tubing you need from your close-at-hand USS Shelby Seamless distributor?

Phone him, write him, drop in and see him—and you'll get prompt, courteous and efficient service, the likes of which you've never seen before.

• The consistent high quality of USS Shelby Seamless Tubing, its dimensional accuracy and superior machining characteristics make it easy to fabricate. Use it and cut tool costs, reduce rejects, save both time and money, and turn out a finer product.

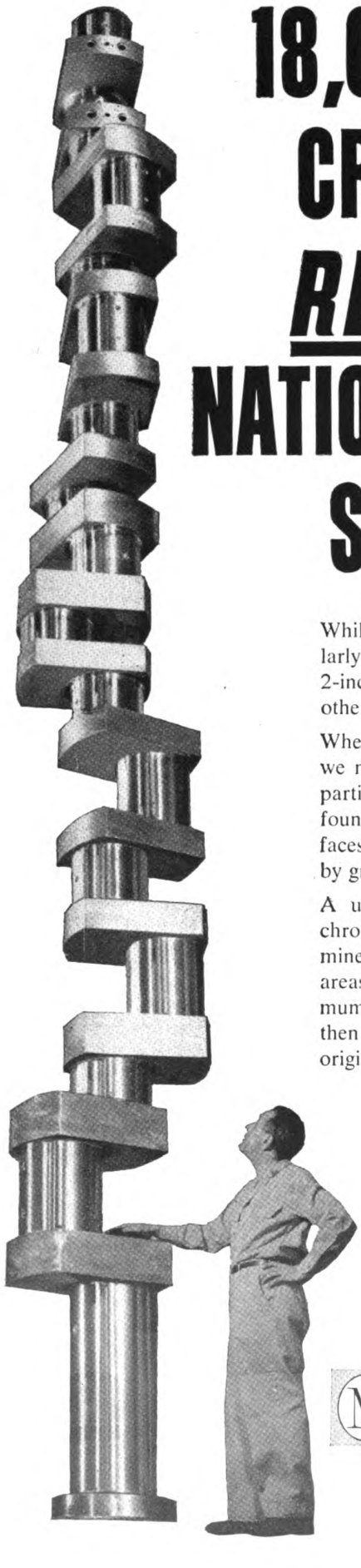
• Shelby Seamless is available in round, square, rectangular, and other special shapes in any commercial size—from ¼" OD to 10¾" OD and in wall thicknesses from .035" to 2.000" . . . in a wide range of steel grades and anneals.

— Contact your Shelby Seamless Distributor now! —

USS and Shelby are registered trademarks

National Tube Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • United States Steel Supply Division
United States Steel Export Company, New York



18,000 POUND CRANKSHAFT *REBUILT* BY NATIONAL FORGE SPECIALISTS

While National Forge specializes particularly in locomotive crankshafts, this 23-foot 2-inch compressor crankshaft was just another routine reconditioning job.

When this shaft arrived at National Forge, we made a thorough visual and magnetic particle inspection. After the shaft was found to be salvageable, all the bearing surfaces were prepared for chromium plating by grinding and grit blasting.

A unique plating machine deposits the chrome uniformly smooth to a pre-determined thickness—and away from fillet areas. After re-grinding—held to a minimum by accurate plating—the shaft was then finished ground and polished to the original specifications.

No other plating company has National Forge's experience in handling both new and rebuilt crankshafts. So, why not try National Forge Specialists on your next crankshaft rebuilding job?

Write for Bulletin RC-1.

NATIONAL FORGE & ORDNANCE COMPANY
IRVINE, WARREN COUNTY, PA.

It is easily resharpened and has a pipe ca pacity of ⅛ to 2 in. A modified vise sta now available, has mounting holes for ma popular-make vises, and elastic stop nuts h all fastened elements. A new and more ver tile steel tray is claimed to positively pre folding of this Model 8A while in use. *Toe Pipe Threading Machine Company, De RLC, 1445 Summit Street, Toledo 4, Ohio.*

Grounded Portable Lights

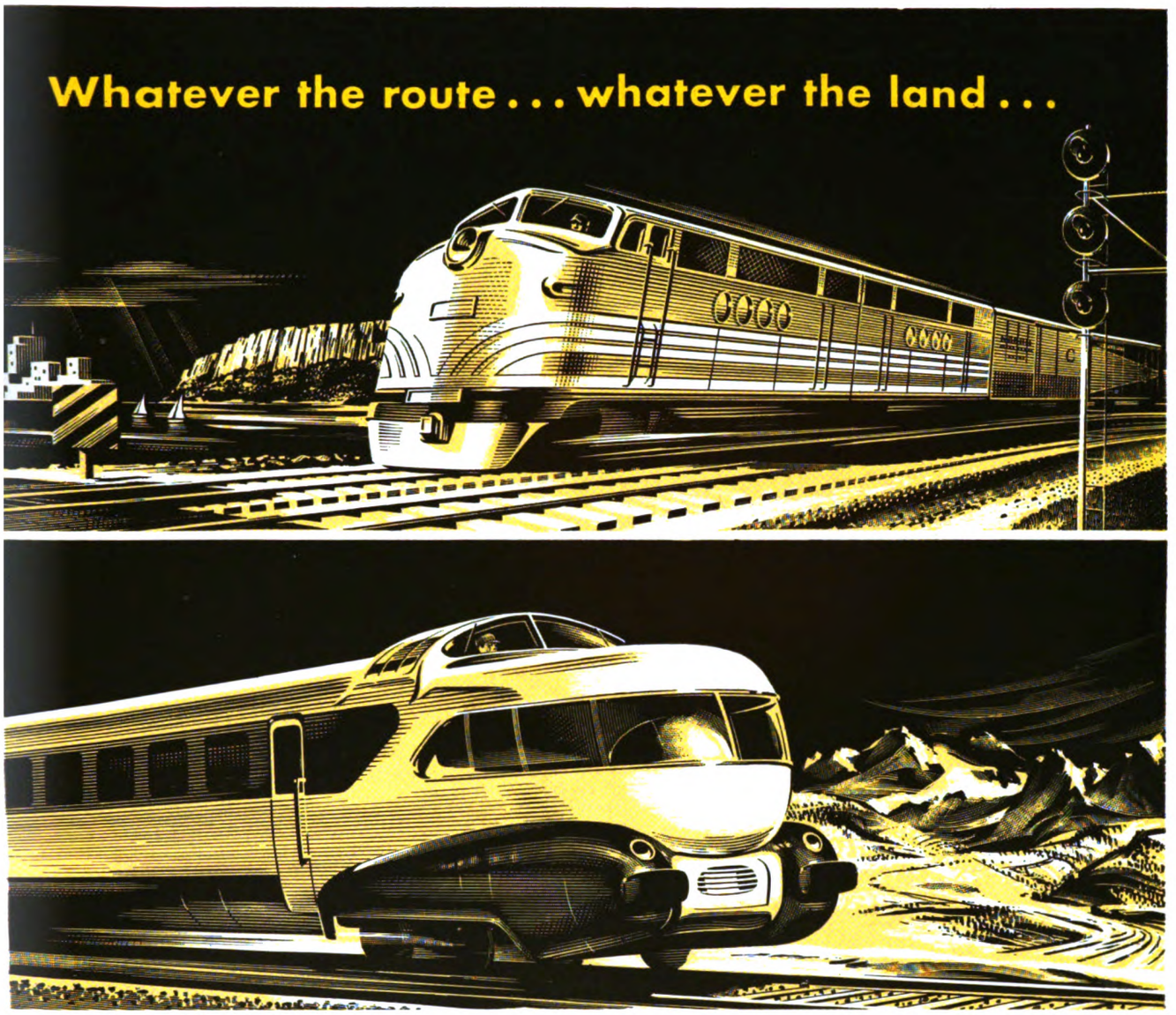
This portable lighting unit can provide 2 to 400 watts of grounded illumination at 12 or 32 volts, from conventional 110/1 volts a-c power sources. Reported to be sa for use around metal structures, even dripping wet conditions, it has of a circu breaker protected "step-down" transform housed in a moisture-tight cast aluminu case. One to four handlamp extensions pl into receptacles on each end of the carryi case.

The unit is supplied with a 6-ft power c tension with male end plug that connects conventional three-contact grounded fema receptacles. The third wire in each extensi connects ground to the transformer case a to the metal lamp guards. Handlamps a commodate screw-in style medium base bul —50 and 75-watt for 8 and 12 volt sets, a 50 and 100-watt sizes for 32 volt sets. *De V-130, Joy Manufacturing Company, 12 Macklind Ave., St. Louis 10.*

Running Board

The new improved one-piece Morton "Un Wing" Open-Grip Type III running boar features redesigned side flanges for each sid of the longitudinal board. A single die form ing operation presses the flanges and riv application pads from the flanges, eliminatin weld-on brackets which would loosen if wel was defective. Improved edge forming of th lateral board eliminates welding on bracke to join this board to the long board. Ma terial is 13-gage mild steel, hot-dip galvanize after fabrication. The open-grip debossing

(*Continued on page 68*)



Its performance and name are the same around the world

Other Outstanding Shell Industrial Lubricants

Shell Tellus Oils—for closed hydraulic systems
Shell Alvania Grease—multi-purpose industrial grease
Shell Rimula Oils—for heavy-duty diesel engines
Shell Turbo Oils—for utility, industrial and marine turbines
Shell Dromus Oils—soluble cutting oils for high-production metal working
Shell Macoma Oils—for extreme pressure industrial gear lubrication
Shell Voluta Oils—for high-speed quenching with maximum stability

Shell Talona R Oil 40 offers two outstanding reasons for its acceptance as a top-rated diesel-electric locomotive lubricant: (1) It provides superior anti-wear protection. (2) It maintains engine performance at its peak.

Greatly reduced wear on pistons, rings and cylinder liners is assured because of the selected combination of additives used in Talona® R Oil 40. It has high oxidation stability, combined with resistance to corrosion and sludge formation. It prevents ring fouling and provides excellent detergent-dispersant action.

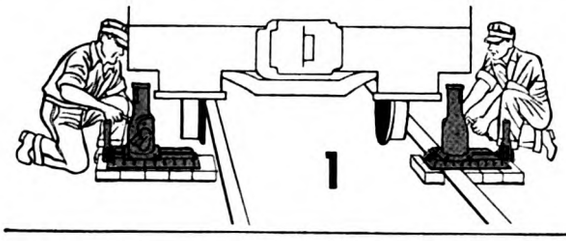
Today—railroad operators abroad can enjoy the same Talona R Oil 40 that domestic carriers rely upon. For complete information, write to Shell Oil Company, 50 West 50th St., New York 20, N. Y., or 100 Bush Street, San Francisco 6, California.

SHELL TALONA R OIL 40

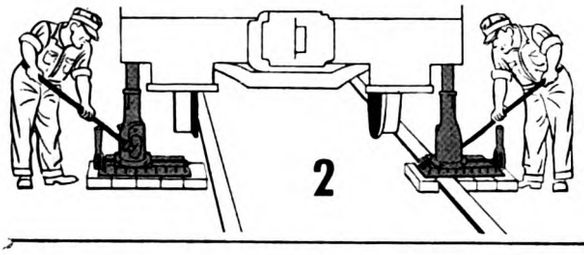
SHELL

How to get back on the track quickly

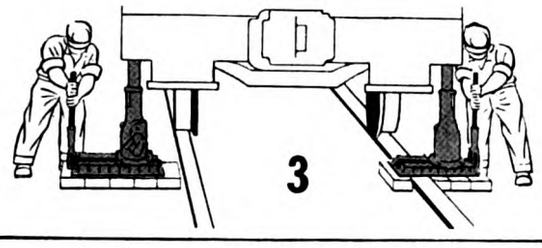
Without A Crane!



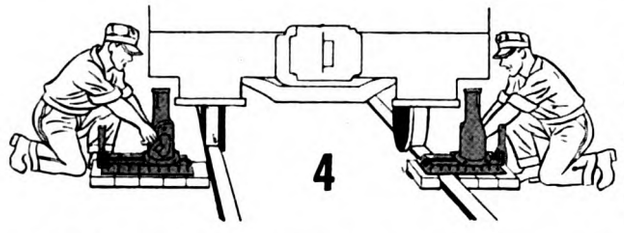
Place a *Duff-Norton traversing base* and *jack* beside each derailed truck.



Jack up the car or locomotive until wheels clear top of rails.

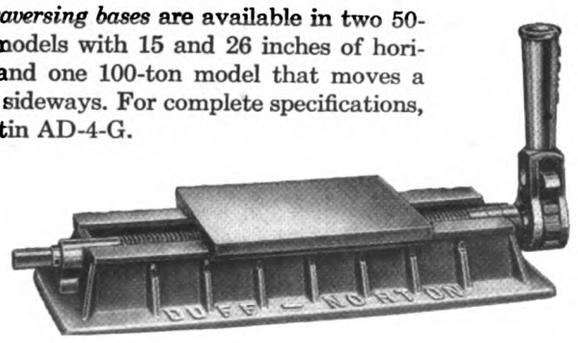


Move jacks horizontally simultaneously on traversing bases until wheels are in alignment with rails.



Lower wheels; you are back on the track, quickly, inexpensively and without danger of distorting car or locomotive frame.

Duff-Norton traversing bases are available in two 50-ton capacity models with 15 and 26 inches of horizontal travel and one 100-ton model that moves a load 20 inches sideways. For complete specifications, write for bulletin AD-4-G.



DUFF-NORTON COMPANY

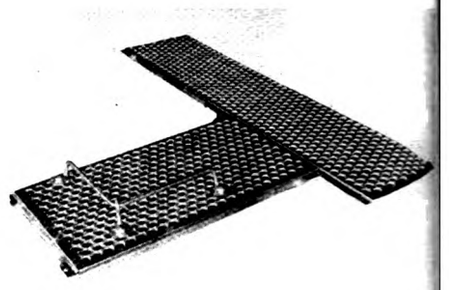
P. O. Box 1889 • Pittsburgh 30, Pennsylvania

COFFING HOIST DIVISION • Danville, Illinois

DUFF-NORTON JACKS
Ratchet, Screw,
Hydraulic, Worm Gear

DUFF-NORTON

COFFING HOISTS
Ratchet Lever
Chain, Electric



provide required snow clearance area. Raised Kass buttons around the debossings provide gripping action and do not lose safety features through wear.

According to the manufacturer, the one-piece construction is stronger and the die-formed accuracy of the design makes it easier to apply, *Morton Manufacturing Company, Dept. RLC, 5125 West Lake st., Chicago 44.*

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

TRIPLE HOPPER CAR.—8-page bulletin (GV-1) contains general arrangement drawing and complete information on new Greenville automatically welded 70-ton GV-1 package triple hopper car. (Write: *Greenville Steel Car Company,* Dept. RLC, Greenville, Pa.)

HYDRAULIC PULL TOOLS.—8-page catalog (Form 8-420) describes hydraulic pull tools for installing Huckbolt fasteners and blind rivets. Lists hydraulic pull tool nomenclature and describes in detail each of three basic units available from Huck. Standard Huck power cell and Huck power pack also mentioned. (Write: *Huck Manufacturing Company,* Dept. RLC, 2480 Bellevue ave., Detroit 7.)

INDUSTRIAL BATTERIES.—New edition of C & D General Service Manual gives data on industrial batteries on cycle service, including industrial truck, railroad diesel starting, car lighting and air conditioning, etc. Includes charts, tables, methods of repair, instructions covering repairs with special or regular tools, simplified testing methods, and instruction on correct charging methods. (Write: *Advertising Department, C & D Batteries, Inc.,* Dept. RLC, Conshohocken, Pa.)

GEARED-HEAD LATHES.—32-page Bulletin No. 1216 describes construction, design, and operating features of Betts heavy-duty

(*Continued on page 70*)

A Cut Above Average

A. Taper Bridge Reamer (Straight Flute)

B. Taper Bridge Reamer (Spiral Flute)

C. Car Reamer (Straight Flute)

High grade small tools perfected through years of specialization.

BRIDGE REAMERS
CAR REAMERS
MUD RING REAMERS
EXTENSION REAMERS
COUNTERSINKS
LOCOMOTIVE REAMERS
HAND REAMERS
JOBBERS REAMERS
CHUCKING REAMERS
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PIN REAMERS
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SPECIAL REAMERS

WAYNE TOOL CO.
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SMALL W TOOLS

America's foremost engineered lettering tools

designed to reduce your present costs

50 to 80%

Used today by 1/3rd of the Nation's leading Railroads . .

DN

Spray it-®

STENCILS

PRESSURE SENSITIVE TYPES

Easy to apply. No skill required. Produces the most accurate and durable type of lettering, numerals, medallion, and other types of markings. Adds long life to your identification or advertising on all your equipment . . .

Whatever your lettering problems may be regarding identification, advertising, reflective or non-reflective, the DEMP-NOCK LETTERING SYSTEMS can help you get the job done in less time.

For additional information write Dept. RR-100

THE DEMP-NOCK COMPANY ®

DEMP NOCK

21433 MOUND ROAD • VAN DYKE, MICHIGAN • U.S.A.

DIESEL MAGNUSOL NOW STANDARD CLEANER ON LEADING RAILROADS...

. . . Used On Large And Small Lines For 90% Of All Operating Diesels.

Recognizing that the cleaning of diesel power units is one of the most important daily jobs faced by the Mechanical Department, it is impressive to note that DIESEL MAGNUSOL is the most widely used product for this job in the country.

HERE ARE THE REASONS

- Soluble in water or solvent, DIESEL MAGNUSOL quickly penetrates oil, dirt and grease accumulations.
- DIESEL MAGNUSOL is readily emulsified and flushed away with a pressure stream of water.
- DIESEL MAGNUSOL may be sprayed or brushed on.
- Safe for skin, metals, or good paints and varnishes, DIESEL MAGNUSOL is non-toxic and has no objectionable odor.

AND it is ECONOMICAL!

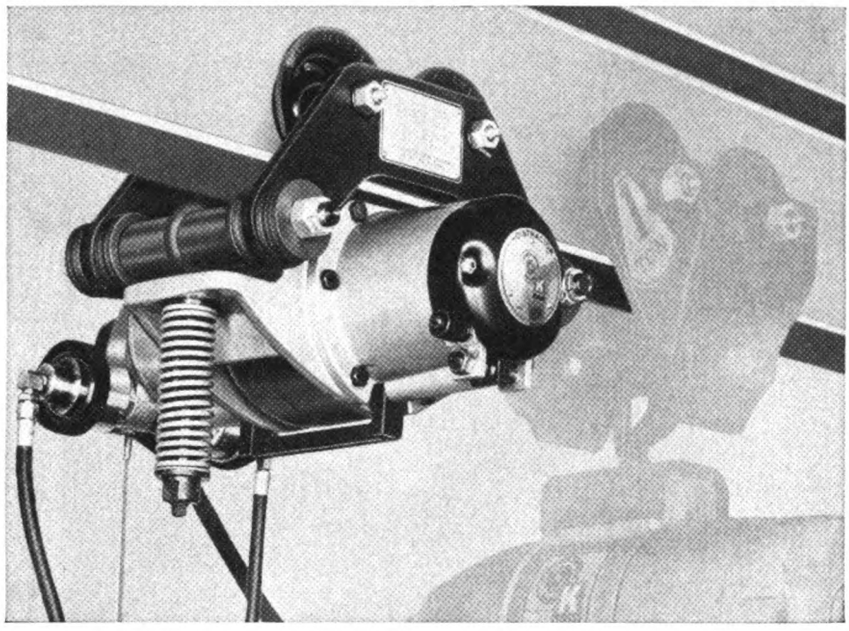
For most applications DIESEL MAGNUSOL is used at a rate of one part to eight parts of kerosene or diesel distillate. Moreover, for those who object to the use of a solvent inside a diesel or those facing drainage problems, DIESEL MAGNUSOL may be diluted with water in a one to five parts water ratio with good effectiveness.

For free, full information on this modern Magnus method of diesel power cleaning, write to Magnus, 77 South Avenue, Grawood, New Jersey.

RAILROAD DIVISION

magnus
CHEMICAL COMPANY INC.

magnus a world-wide organization specializing in cleaning and protection of all surfaces.



Now, push-pull power with new

HOISTRACTOR

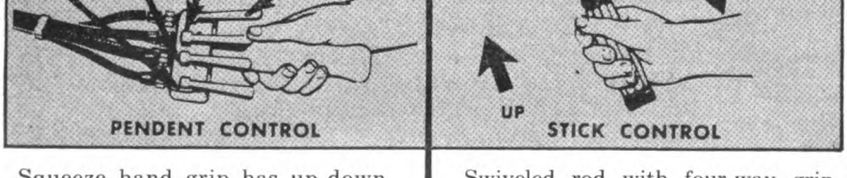
Now, it's an easy one-man, one-hand operation to raise, lower or move loads up to two tons. Simply use the new Keller "Hoistractor." This air-powered hoist trolley, connected to any beam hoist by a drawbar, rides the same beam as the hoist. Hoist lifts and lowers . . . "Hoistractor" moves hoist and load along the beam.

New HOISTRACTOR features

- Fast, safe movement of heavy loads—without operator fatigue.
- Speed variable from slow creep to full-load speed of 70 ft. per min.
- Axial-piston air motor exerts 250-lb. drawbar pull on beam.
- Sensitive air controls permit smooth acceleration and deceleration . . . accurate load spotting.
- Easily adjusted mechanical brake for positive stopping. Brake, not dependent on air supply, is applied automatically in event of air line failure.

Write for Bulletin 87-1.

ONE HAND CONTROL—two types available



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geared-head lathes, 48 in. to 144 in. a larger. Specifications included for each (Write: *Consolidated Machine Tool Divi Farrel-Birmingham Company,* Dept. RL 565 Blossom Road, Rochester 10, N. Y.)

FIRE PROTECTION.—"Fire Protec Service Plan" points out how to pro against damaging fire loss and empha need for fire-fighting training and prevention planning, and explains services available to users of Ansul equipm (Write: *J. R. West, technical services direc Ansul Chemical Company,* Dept. R Marinette, Wis.)

WELDIRECTORY.—12-page weldirec tells how to select the most efficient electro for any particular welding job. Describes ba characteristics of Fast Freeze, Fast Fill, a Fill Freeze electrodes, also physical prope current ranges, sizes and welding procedu for each. Wall chart contains frequen used information about Lincoln electrod (Write: *Lincoln Electric Company,* Dep RLC, Cleveland 17.)

ARMATURE BANDING TAPES. Bul RE65-1 gives technical information on pro erties and application of RES-I-GLAS ta for diesel armatures and generators, tra formers, etc. Discusses also methods of ancing on the band. (Write: *Chicago Pri String Company,* Dept. RLC, 225 Fifth A New York 10.)

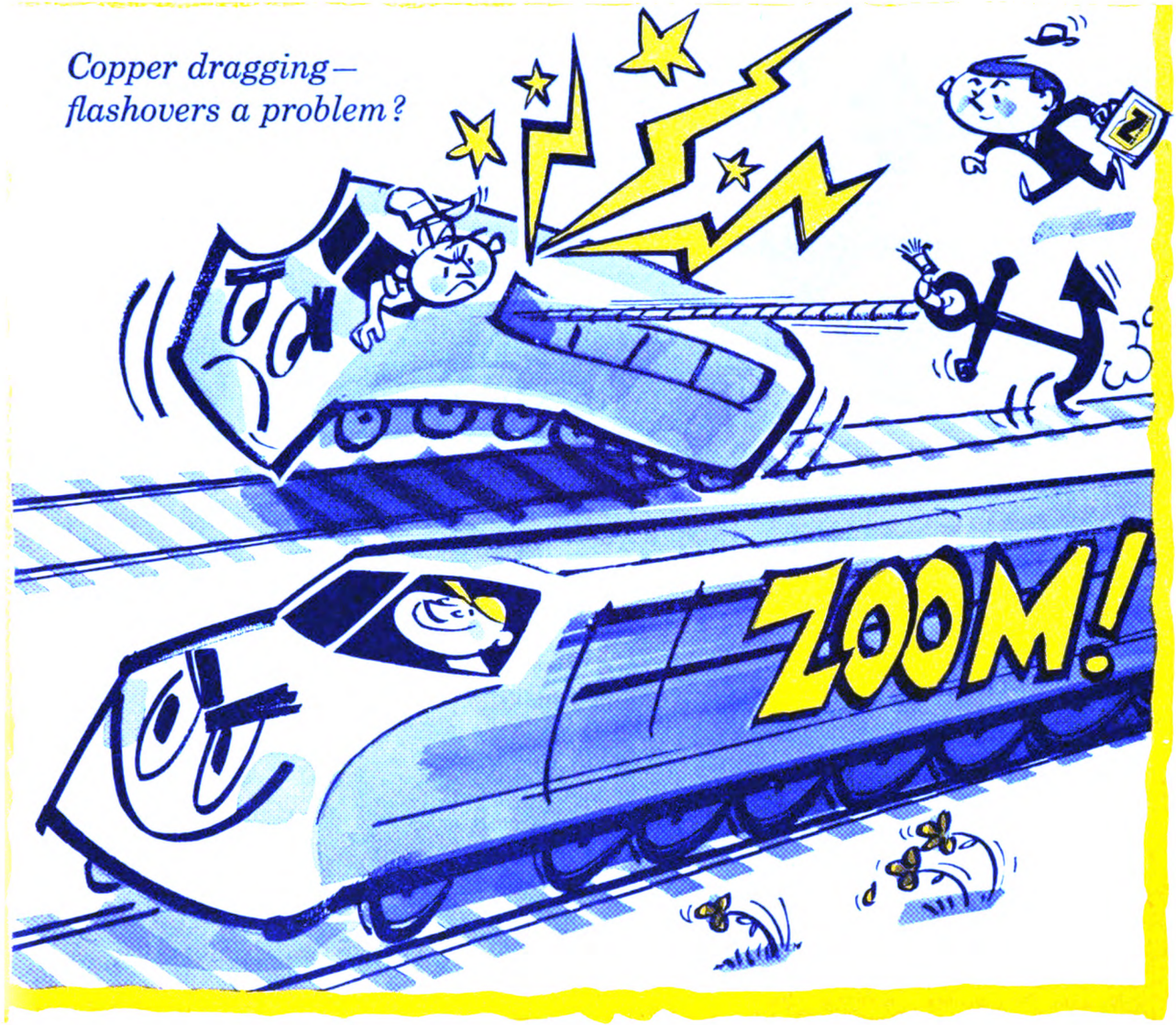
LADDERS. 20-page booklet illustrates new models of pyramid design step ladde for working heights up to 15 ft. Gives tailed specifications and shows typical us Describes also other Ballymore ladders. h draulic lifts and fixed of adjustable-level w platforms. (Write: *Ballymore Compan* Dept. RLC, West Chester, Pa.)

AIR BRAKE FITTINGS. 4-page, Form N 556 lists advantages of Dresser air bra fittings for railroad cars over other joint pipe joining method. Describes salient fe tures of fittings, seals, cups, with illustratio of typical applications. (Write: *Dresser Ma ufacturing Company,* Dept. RLC, Bradfo Pa.)

ANTI-FRICTION BEARINGS. 32-page tec nical bulletin describes care and maintenan of anti-friction bearings. Subjects include and grease lubrication, frequency of re-lu cation, periodic cleaning, choosing bear replacements, proper mounting procedu and causes of bearing failures. (Write: M *cony Mobil Oil Company, Railroad Divisi* Dept. RLC, 59 East Van Buren st. Chica 5.)

PIPE COUPLINGS AND FITTNGS. page Form No. 1054-R contains line dra ings and photographs showing coupling a fitting applications to fuel, lube, oil, wat air and vent lines on diesel locomotive Charts give complete specifications. (Wr *Dresser Manufacturing Company,* De RLC, Bradford, Pa.)

DIESEL FUEL OIL TREATMENT. 4-pa folder describes Xzit diesel fuel-oil treatme heavy diesel fuel-oil treatment, and econo diesel fuel-oil treatments and gives direc for their use. Describes also Xzit diesel l oil, powdered diesel Xzit, degreasing solve and diesel cooling water treatment. (Wr *Xzit Chemical Company,* Dept. RLC, 1 14th st., Hoboken, N. J.)



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Subsequently a complaint was registered with Lou that the copper dragging condition had not been eliminated. Upon investigation it was found that not one of the main generators completely equipped with DE-2 brushes was involved in the complaint. This instigated an immediate 100% conversion to "National" brush grade DE-2 on *all* generators.

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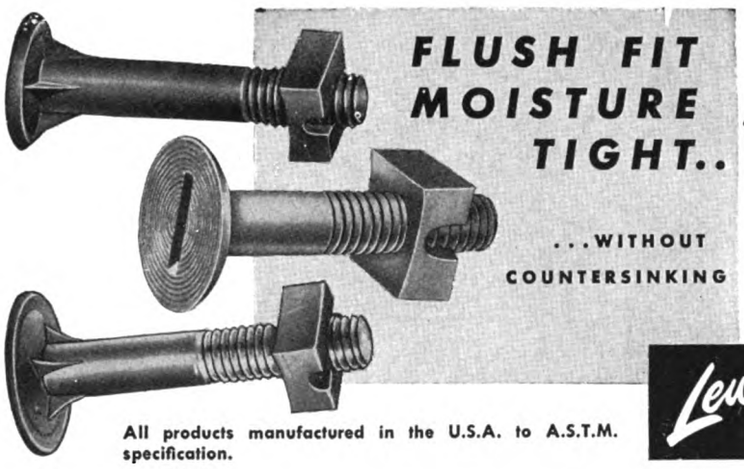

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—ADVERTISERS IN THIS ISSUE—

Adams and Westlake Co. 4
Air Maze Corp. 20
American Steel Foundries 46, 47

Baldwin-Lima-Hamilton Corporation, Hamilton Division 59
Bethlehem Steel Co. 51
Biddle Co., James G. 58
Broderick & Bascom Rope Co. .... Inside Back Cover

Dana Corporation 15
Dayton Rubber Mfg. Company 26, 27
Demp-Nock Company 69
Duff-Norton Co. 68
Du Pont De Nemours & Company (Inc.), E. I., Petroleum Chemicals Division 11

Elastic Stop Nut Corp. 25
Esso Standard Oil Co. 43
Exide Industrial Division-Electric Storage Battery Co. 6

Fairbanks-Morse & Co. 22, 23

Gardner-Denver Company 70
General Steel Castings Company 19
Griffin Wheel Co. 12, 13
Gulf Oil Corporation 16, 17

Lewis Bolt & Nut Co. 72
Linde Company, a Division of Union Carbide Corporation 63

Magnus Chemical Co., Inc. 69
Magnus Metal Corporation 28, 45
Miller Lubricator Co. 53

National Carbon Company, Div. of Union Carbide Corp. 71
National Electric Coil Company 3
National Forge and Ordnance Co. 66
National Malleable & Steel Casting Co. 55
National Tube Division, United States Steel Corporation 65

Oakite Products, Inc. 64

Pullman Standard Car Mfg. Co. 8, 9, 24

Schundler & Co., Inc., F. E. 62
Shell Oil Company 67
Snap-On-Tools Corporation 56
Sperry Rail Service, Division of Sperry Products, Inc. 7
Stackpole Carbon Co. 60
Standard Car Truck Company 61
Standard Railway Equipment Co. 57
Stran-Steel Corporation, Unit of National Steel Corporation 49

Texas Company ..... Inside Front Cover
Timken Roller Bearing Co. ..... Back Cover
Toledo Pipe Threading Machine Co. 53

Union Carbide Corporation, Linde Company Division 63, 71
United States Graphite Co. 21
United States Steel Corporation (NTD) 65

Wayne Tool Company 69
Wine Railway Appliance Co. 41

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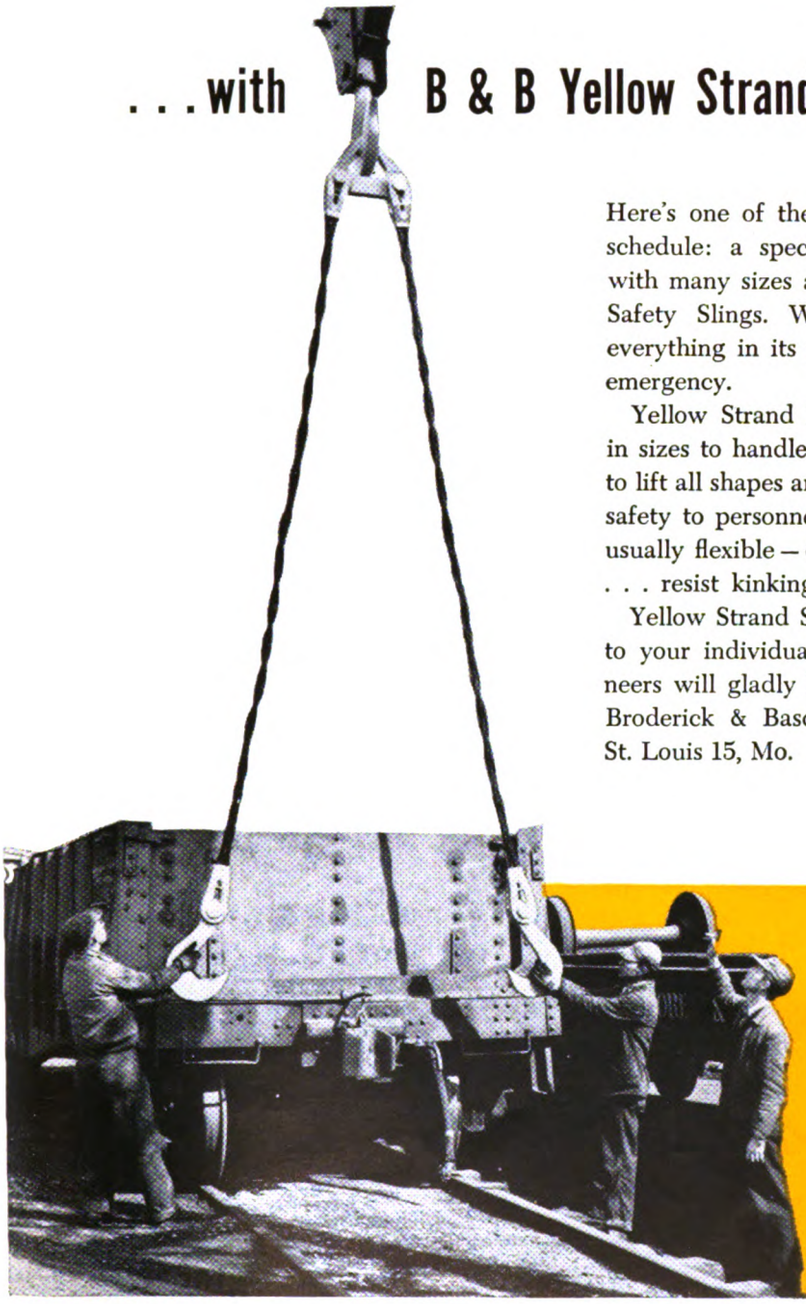

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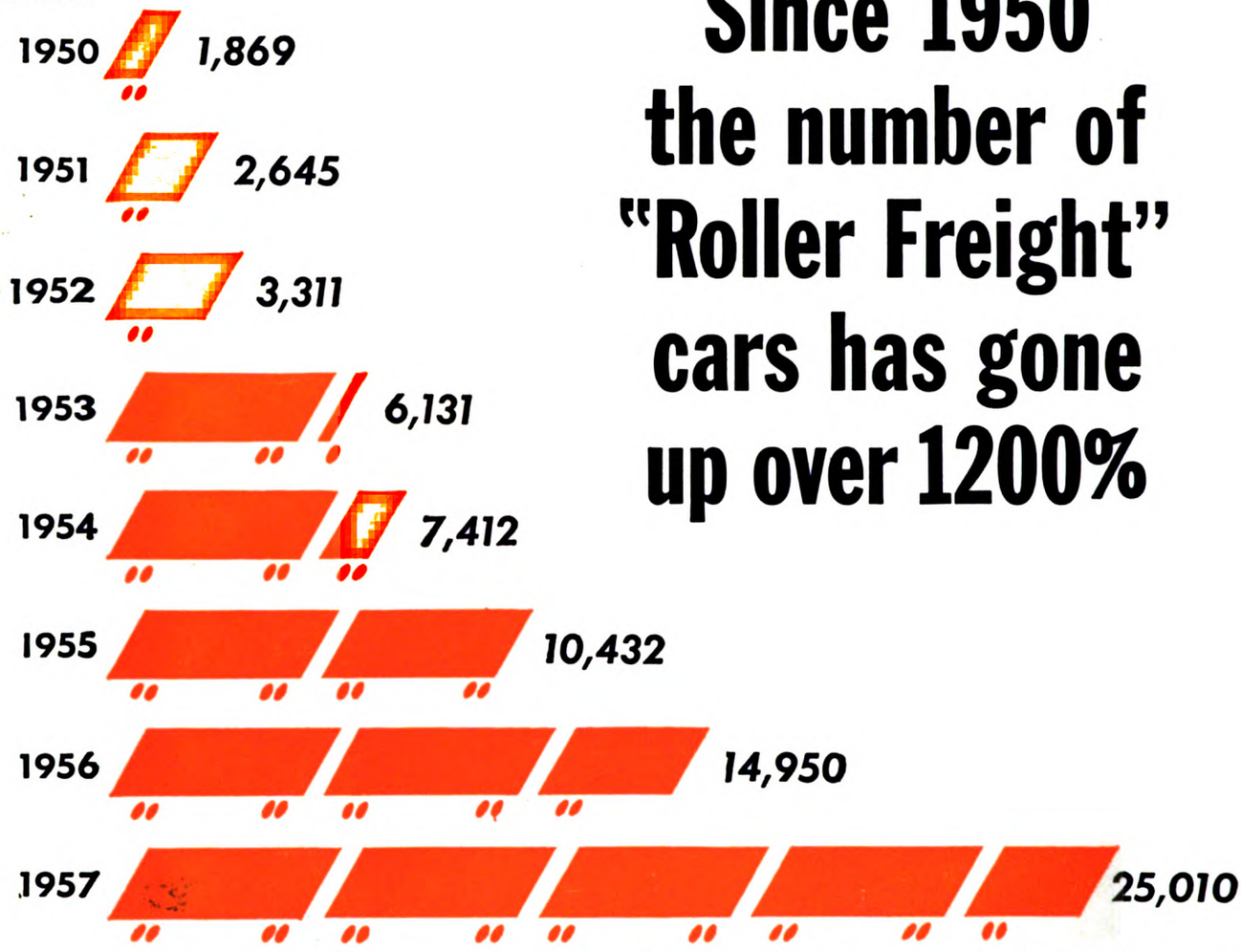

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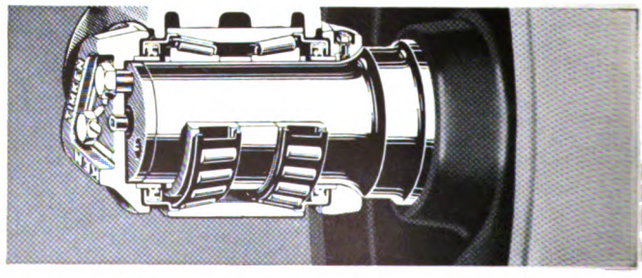

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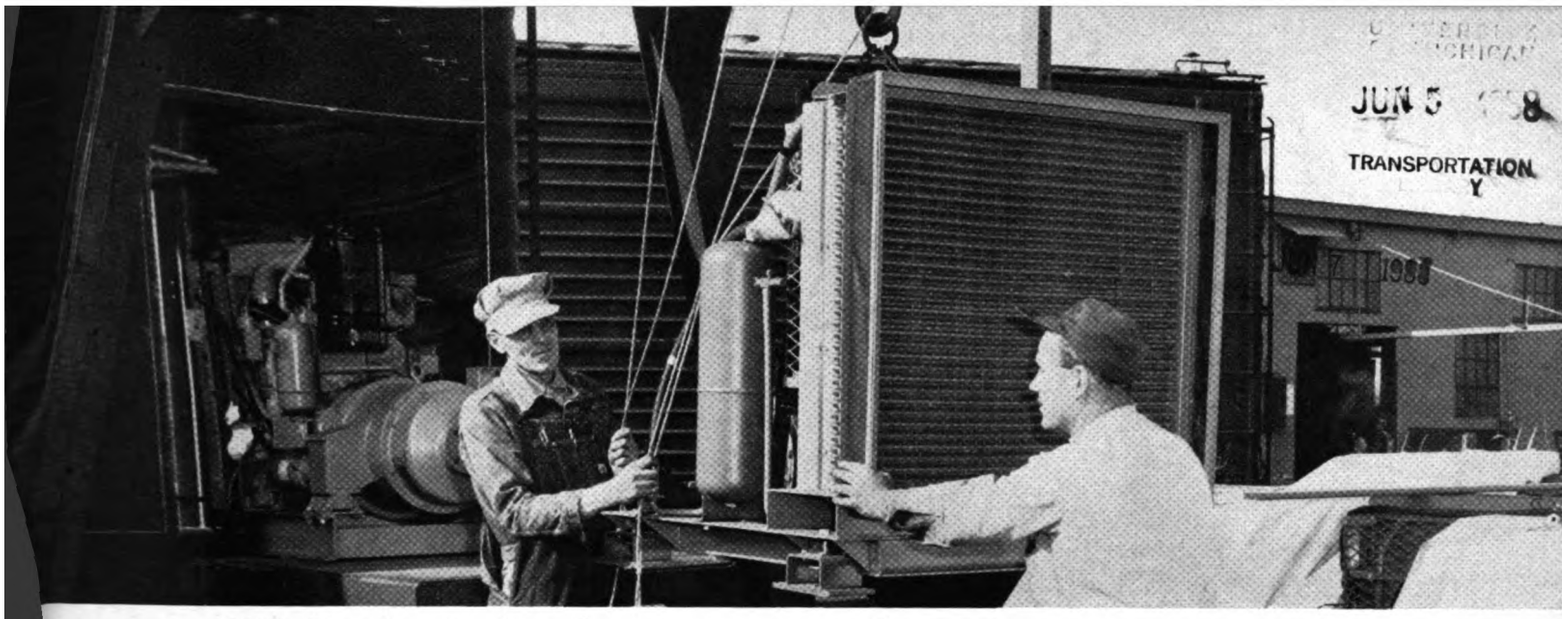


JUN 5
TRANSPORTATION
Y

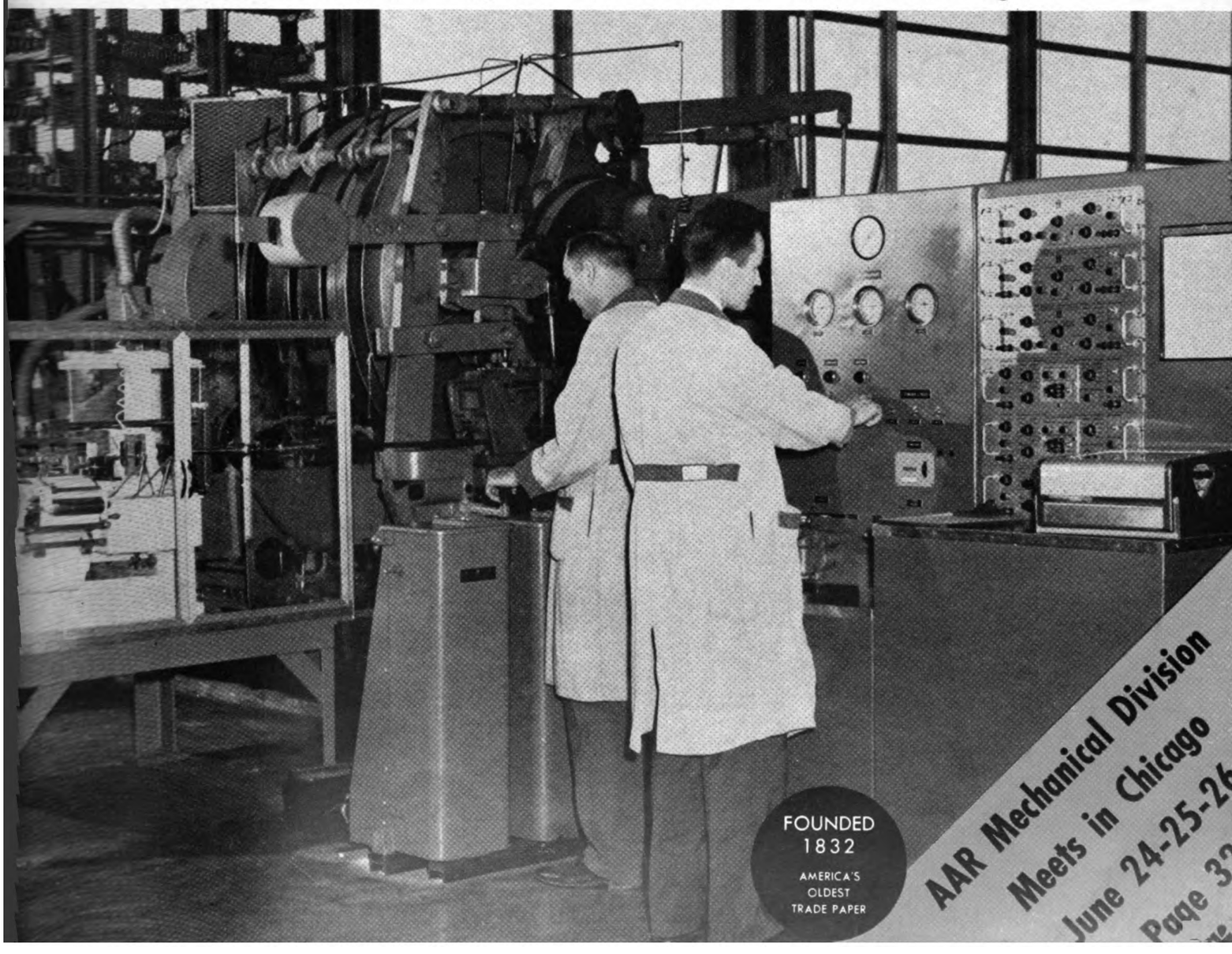
PFE Mechanical Refrigerator Car Fleet Grows . . . Page 27

RAILWAY LOCOMOTIVES AND CARS

A SIMMONS-BOARDMAN **TIME-SAVER** PUBLICATION

JUNE 1958

AAR Laboratory Investigates Diesel Wheel Stresses . . . Page 35



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AAR Mechanical Division Meets in Chicago June 24-25-26 Page 32

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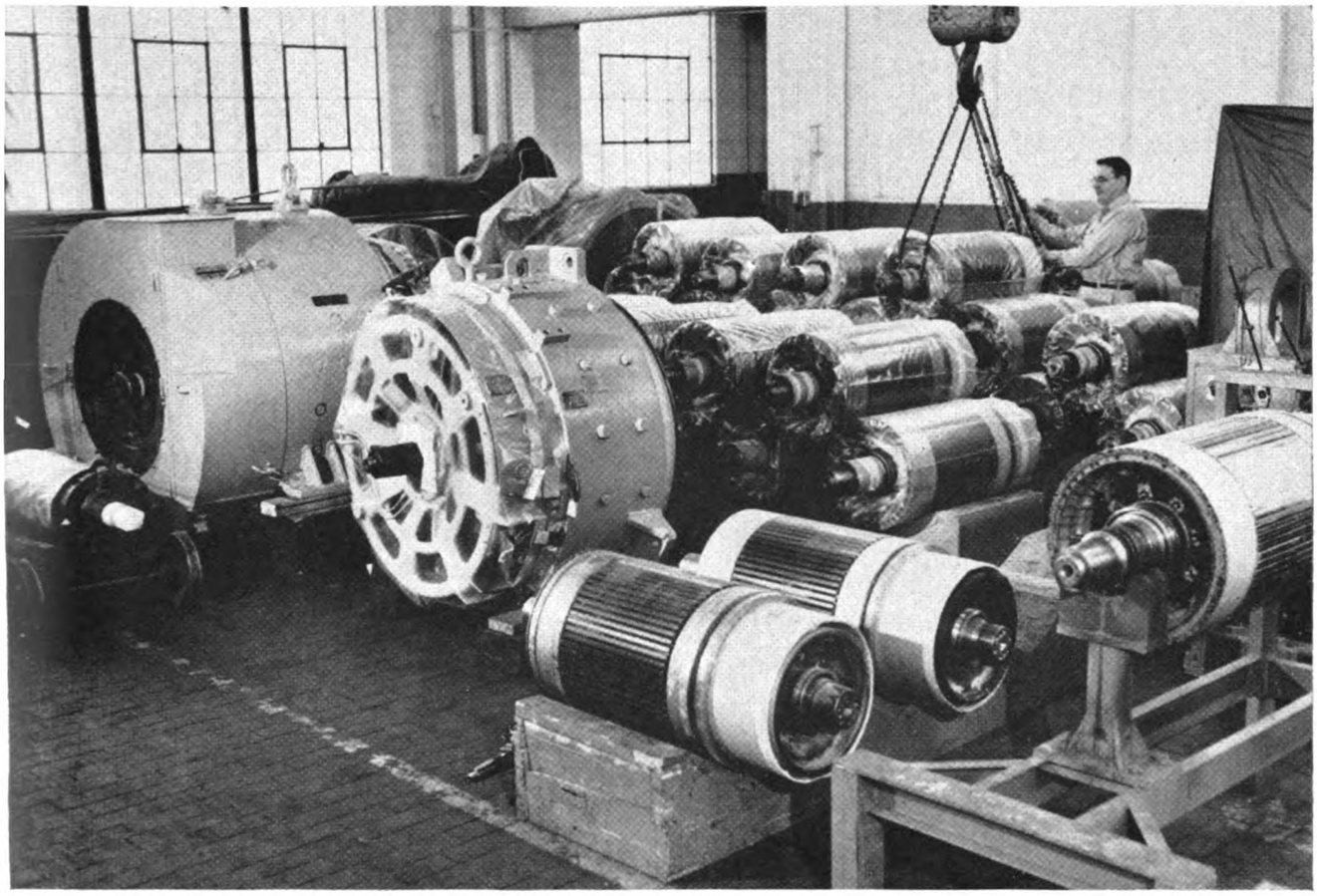

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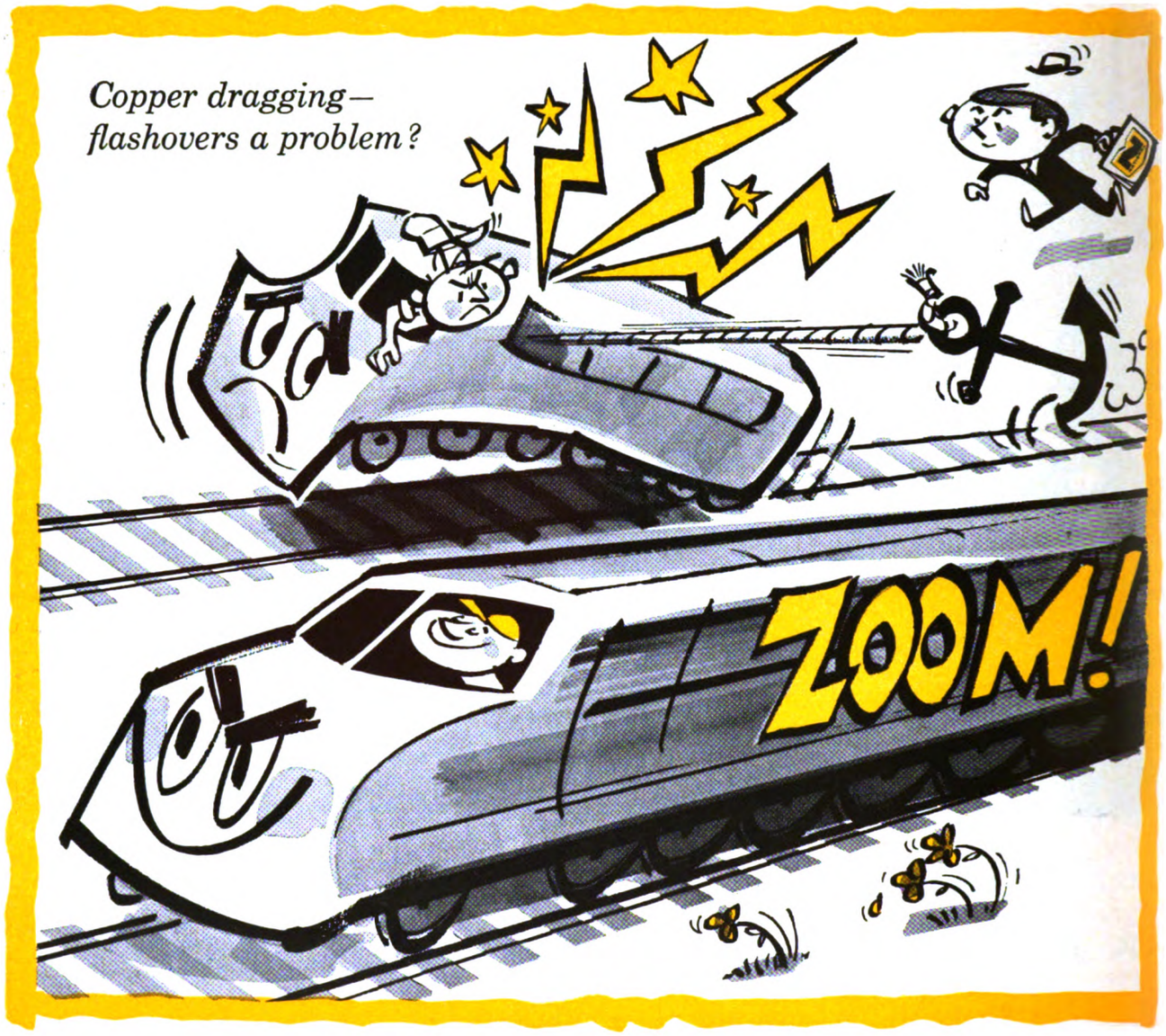

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TIME-SAVING IDEAS FOR

JUNE 1958

Volume 132 • No. 6

MOTIVE POWER AND CAR

PFE Expands Mechanical Reefer Fleet 27
Pacific Fruit Express is spending $20,000,000 to build 1,000 mechanical refrigerator cars, including its first "all purpose" units.

Norfolk & Western Uses Automatic Nailers 29
Mechanized nailing on the light repair track at Roanoke, Va., has reduced the cost of relining box cars and speeded the process.

SP Terminal Speeds Diesel Servicing 30
At Houston, Tex., new service facilities, rearranged track layout, and a new shop building have cost over $600,000.

Program for 1958 AAR Meetings 32
The Mechanical Division and the Electrical Section will hold their annual three-day sessions at Chicago on June 24, 25 and 26.

How the Mechanical Division is Organized 33
Standards for construction and maintenance of railroad rolling stock are the responsibility of this industry group.

Mechanical Research Moves Ahead 35
Even though some AAR expenditures have been reduced, research activities are being continued at the 1957 level.

Latest Electrical Equipment Exhibited 40
Railway Electric Supply Manufacturers are holding an exhibit in Chicago in conjunction with the Mechanical Division and Electrical Section meetings.

EMD Applies 26-L Locomotive Brake 42
Milwaukee Road road-switchers and a new export locomotive have been the first GM units to get the new Westinghouse air brake equipment.

ELECTRICAL

Banding Armatures With FRP Tape 48
Fiberglas-reinforced plastic tape has the mechanical and electrical qualities for traction motor armature banding, and Westinghouse Electric is doing it.

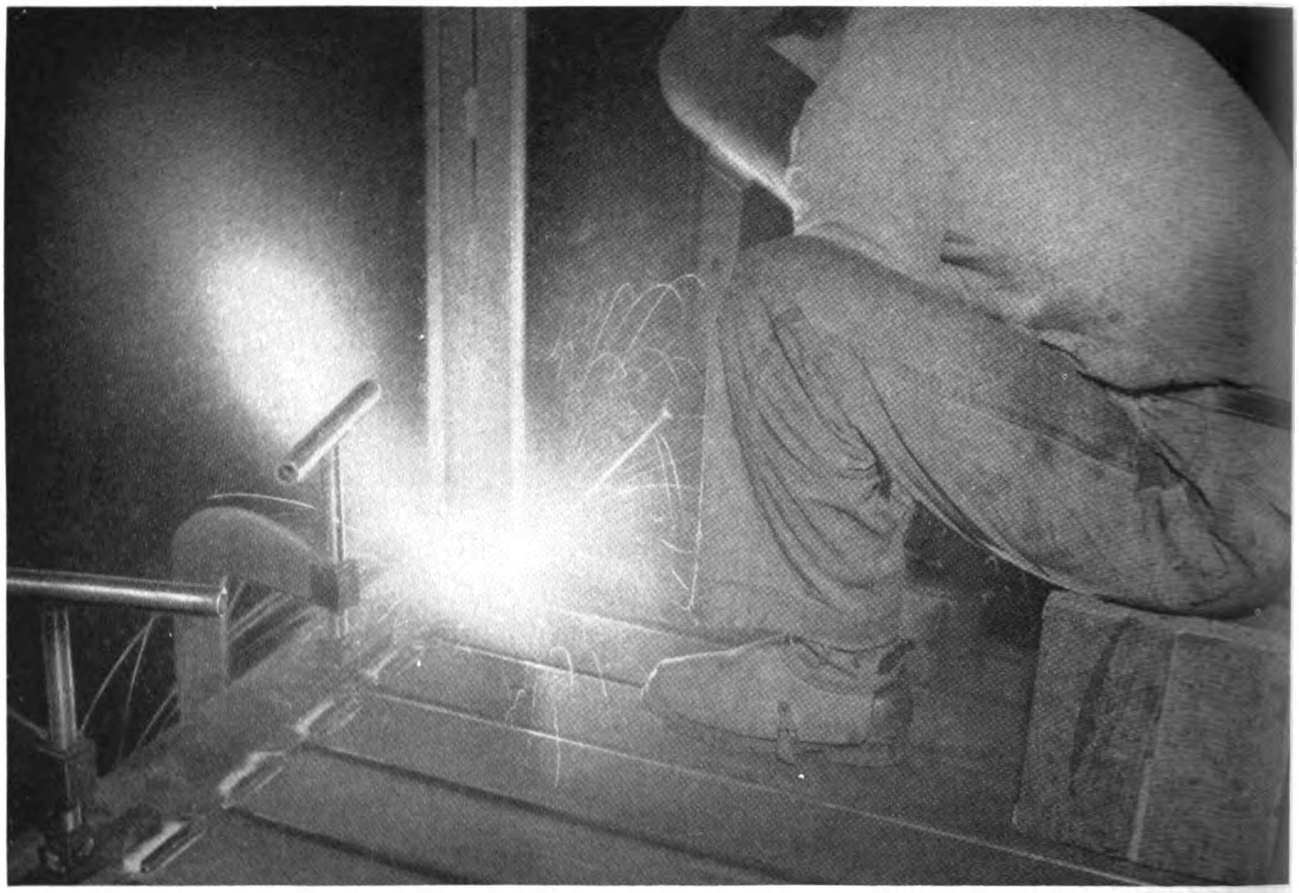
Putting Locomotive Performance on Record 52
Rock Island shop has the equipment for making a complete record of each locomotive load test and these records are filed for future reference.

Test Stand Checks Generators and Regulators 55
Auxiliary generators and voltage regulators are tested and adjusted on a shop-developed unit at the Burlington's back shop.

The Diesel Ran Without Fuel 55
Our April "Diesel Maintainers Notebook" described a locomotive failure which has been further clarified by this month's Letter to The Editor.

DEPARTMENTS

Report 8
Personal Mention 14
What's New in Equipment 18
Helps from Manufacturers 64
Supply Trade Notes 66



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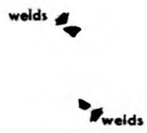

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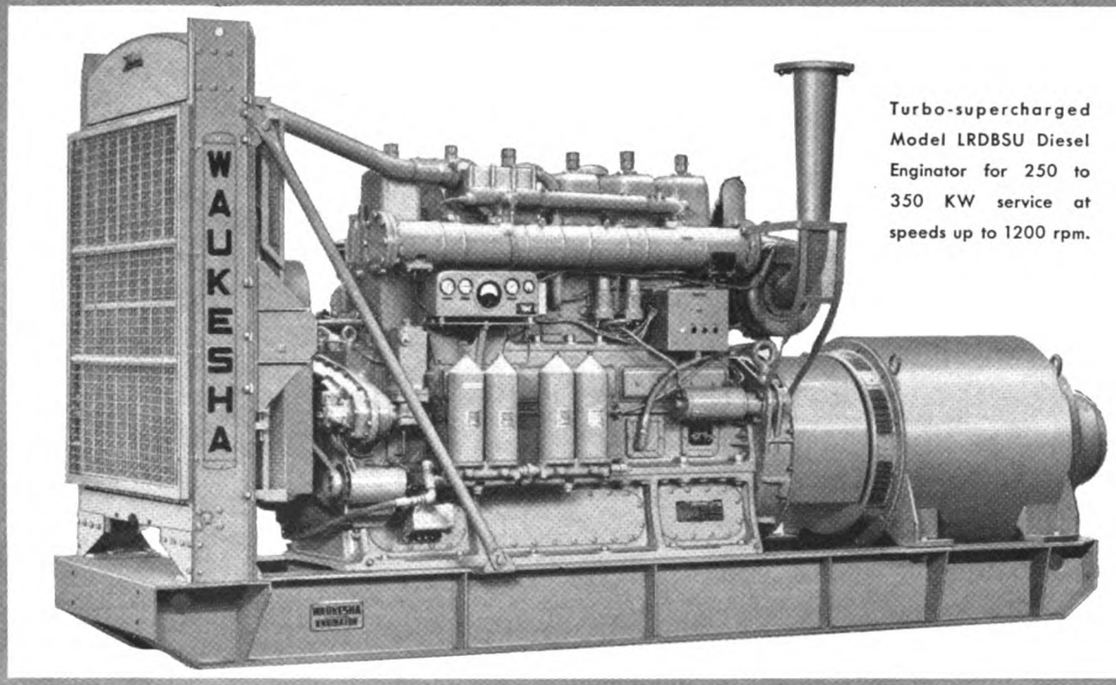

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371

LOCOMOTIVES AND CARS REPORT FOR JUNE

H. C. Wilcox

C. L. Combes

F. N. Houser

Combes Succeeds Wilcox as Editor; Houser Appointed Managing Editor

Harold C. Wilcox retired May 31 as editor of Railway Locomotives and Cars after 34 years of service on the editorial staff of this paper. Charles L. Combes, managing editor, has been appointed editor to succeed Mr. Wilcox. Frederick N. Houser, associate editor at New York, has been named managing editor. Mr. Wilcox joined the staff of this magazine in 1924 as associate editor after several years of experience in the mechanical department of the Delaware, Lackawanna & Western. In 1925 he was transferred to Cleveland as editorial representative both of the Railway Age and Railway Locomotives and Cars (then Railway Mechanical Engineer). Returning to the New York office in 1933 he became managing editor in 1948 and succeeded C. B. Peck as editor when the latter retired in 1954.

While Mr. Wilcox has been active in several engineering societies and in many organizations associated with the railroad industry he has always taken a special interest in serving and promoting the Locomotive Maintenance Officers' Association. He was largely responsible for keeping this association and its predecessor, the International General Foremans' Association, operating during the depression years of the thirties. Since then he has helped to build it to its present important status as an outstanding mechanical department organization serving the railroad industry.

To his many friends who may ask what Harold's plans are for the future it is safe to answer that he will continue to be associated with the railroad industry in some capacity. However, he has many hobbies and interests; he is a collector and a user of guns and fishing equipment, an excellent man with machine tools, a good photographer, and more important, an extrovert with friends in every part of the United States and Canada. Harold will continue to make his home at Pines Lake, New Jersey.

Charles L. Combes, the new editor, joined the staff of the then Railway Mechanical Engineer in 1939 as associate editor. After serving 1941-1945 in the Army, he returned to his editorial job after the war. In 194[illegible] he became managing editor and later edit[illegible] both of the Locomotive and the Car Buil[illegible] Cyclopedias. He returned to the staff [illegible] Railway Locomotives and Cars as manag[illegible] editor on March 1 of this year. (His biograph[illegible] appeared in the April, 1958 issue of RL&C page 14.)

Frederick N. Houser became an associ[illegible] editor of Railway Locomotives and Cars [illegible] New York in 1955. A native of Stoneb[illegible] Pa., he entered Carnegie Institute of Tec[illegible] nology in 1943, but his college career w[illegible] interrupted by service in the Army. Follow[illegible] the war he continued his studies, graduat[illegible] in 1947 from Carnegie Institute with a B[illegible] in M.E. He was employed from 1948 to 19[illegible] by the Bessemer & Lake Erie as draftsm[illegible] special engineer and enginehouse foreman. Before joining the staff of this magazine Mr. Houser was with the Babcock & Wilcox Co. at Beaver Falls, Pa. He is a licensed pro[illegible] fessional engineer in the State of Pennsylvania.

ICC Train Brake Jurisdiction Is Effective August 9

The Interstate Commerce Commission has ordered all railroads operating in interstate commerce to observe and comply with rules, standards and instructions governing the installation, inspection, maintenance and repair of all power or train brakes, effective August 9, 1958.

The order is a result of action by Congress on April 11, 1958, directing the ICC to establish such rules. It was directed to adopt initially the rules of the Association of American Railroads and put them into effect within 120 days after the date of enactment.

The rules will be published in the Federal Register as sections 132.10 to 132.17 of Part 132, Tile 49, under the title "Rules for Inspection, Testing, and Maintenance of Air Brake Equipment."

Transit Problems AIEE Topics

Engineering problems in the design and operation of recently developed rapid transit equipment will be the subjects of discussion at two technical sessions sponsored by the Land Transportation Committee of the AIEE at the summer general meeting in the Statler Hilton Hotel in Buffalo on June 24.

For the morning session the program is: Regenerative Braking, by A. W. Manse[illegible] London Transport Executive; History [illegible] Dynamic Braking, by B. A. Widell and H. [illegible] Henell, General Electric; Air and Regenera[illegible] tive Braking, by C. H. Hines, Westinghous[illegible] Air Brake.

At the afternoon session the followi[illegible] will be presented: Semi-Conductor Batte[illegible] Charger for Rapid Transit Cars, by E. W[illegible]

(Continued on page 14)

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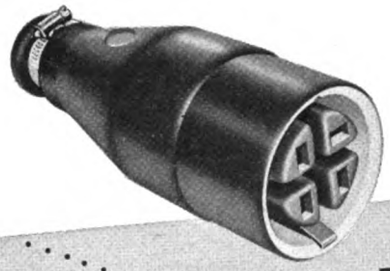
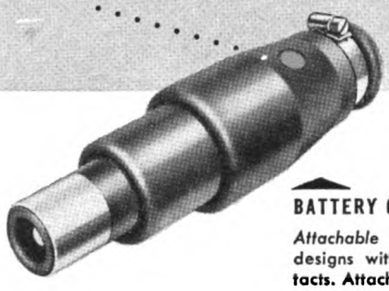


A. C. STANDBY PLUGS
Attachable or *Molded-to-Cable* designs with replaceable contacts. Attachable plug illus.

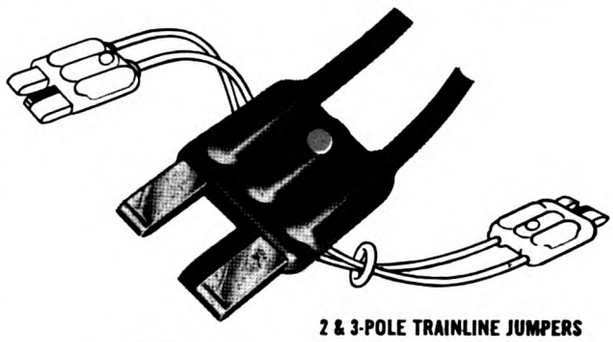
JOY CONNECTORS for CAR EQUIPMENT!



BATTERY CHARGING PLUGS
Attachable or *Molded-to-Cable* designs with replaceable contacts. Attachable plug illus.

If ease of installation, safety and dependable performance are important considerations in your selection of electrical connectors . . . JOY plugs and receptacles rate "top billing" on your "preference list." Factory molded as trim, rubber insulated/Neoprene jacketed units that are **absolutely safe to handle even in dripping wet installations . . . they're shatterproof, distortion-resistant and practically immune to damage by oils, grease and car washing solutions.**

Complete details on JOY connectors for Car equipment as well as many other railway needs may be found in Bulletin #B64. If you haven't received your copy, or need extra copies . . . please fill out and mail the coupon below to:



2 & 3-POLE TRAINLINE JUMPERS
Neoprene/rubber insulated. 2-pole unit illus.

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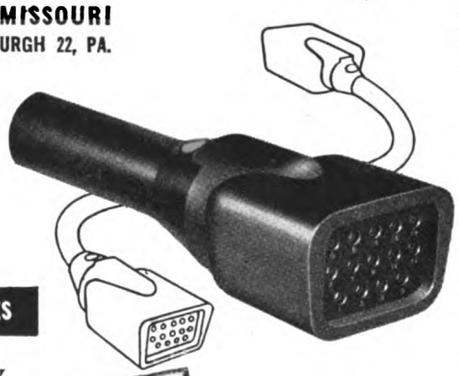

14-POLE R. R. JUMPERS
For car communication and entertainment circuits.

MATING RECEPTACLES
available for above plugs!

Get the facts on these Products in B64

PRODUCT/APPLICATIONS	PAGES
STAND-BY SERVICE	4-7
CAR EQUIPMENT	**8-15**
DIESEL EQUIPMENT	16-21
(Including Traction Motor Sleeves)	
ROTARY SAND DRYERS	22-23
PORTABLE LIGHTING (SAL)	24-28
SPECIAL APPLICATIONS	29-36

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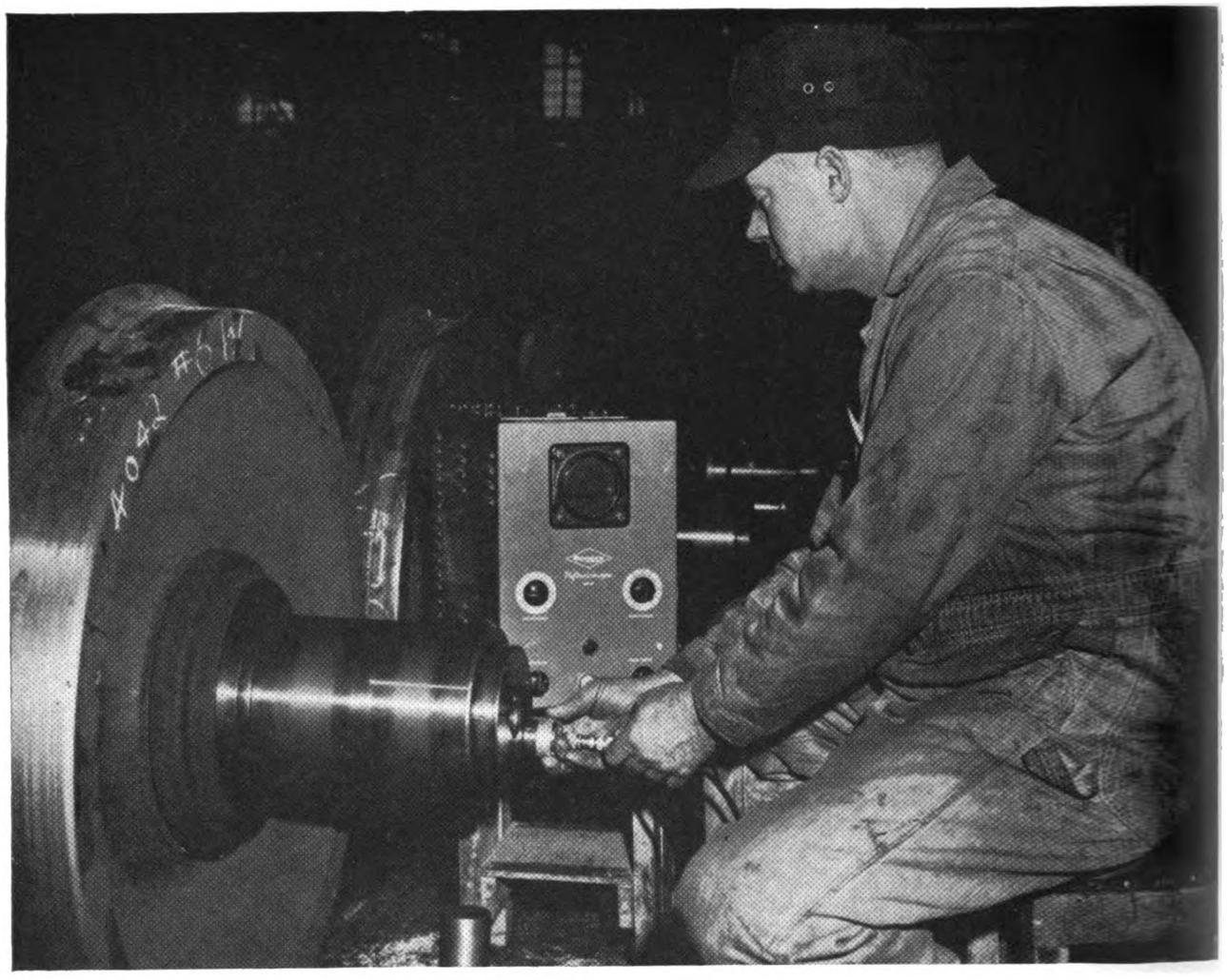

New SPERRY REFLECTOSCOPE cuts time and cost on axle testing

Designed specifically for railroad use, the Type US Sperry Reflectoscope offers a faster, simpler, more accurate and more economical means of testing. Axles can be tested "in place" on locomotives or cars, resulting in major maintenance economies by detecting hidden flaws before they cause costly failures or breakdowns.

The Sperry Reflectoscope offers these advantages:

Complete portability... weighs only 35 pounds

Low power consumption... built-in voltage regulation

Simplified four-knob control panel

New, completely transistorized plug-in alarm system... eliminates possibility of human error

Bright . . . easy to read video presentation

Sperry Reflectoscope Type US is another fine example of Sperry Rail Service's "engineering exclusively for railroads." If you're interested in cutting maintenance costs and achieving maximum equipment utilization, send for details of this outstanding inspection tool.

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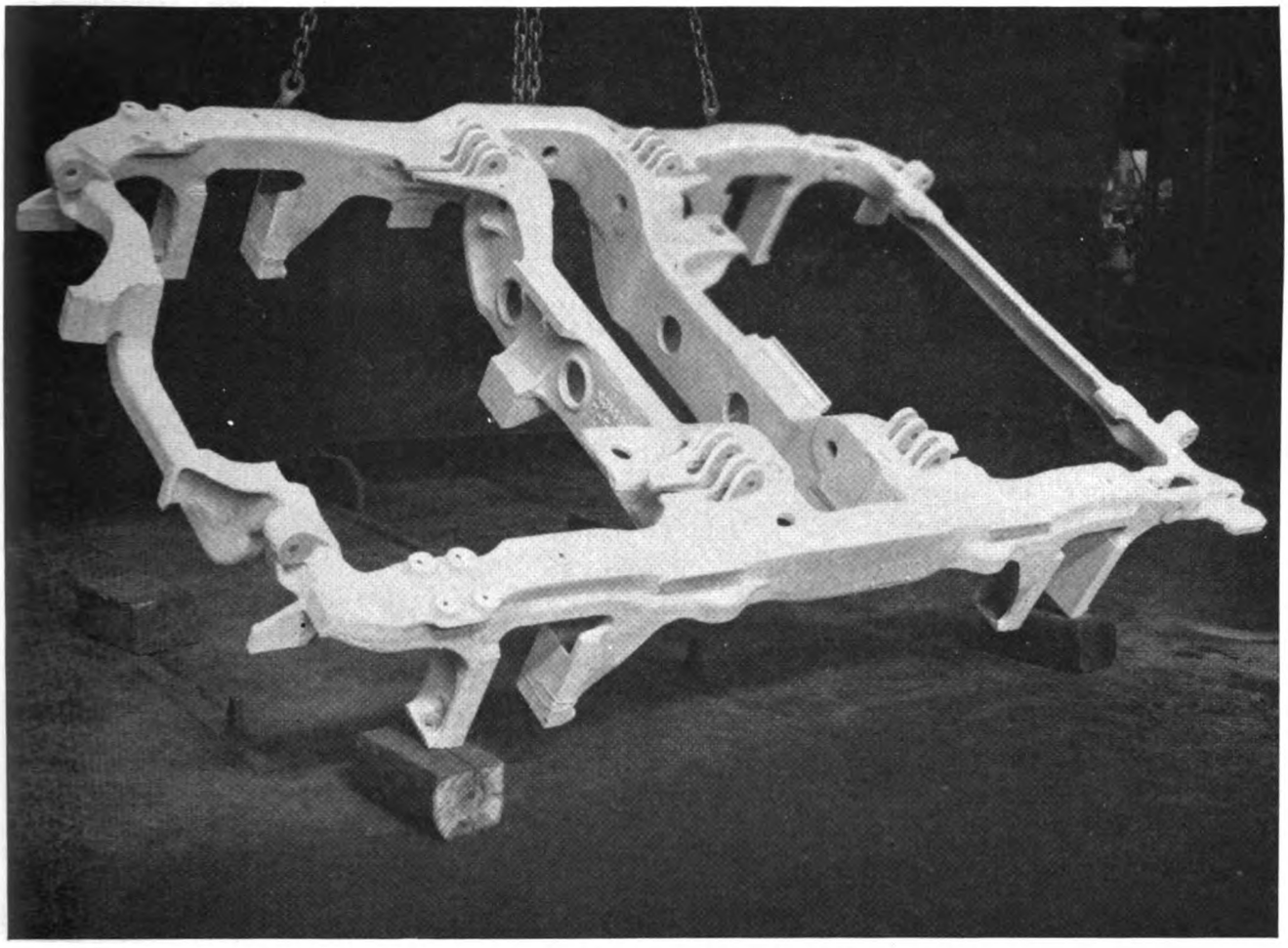

One-piece 2¼% nickel, low carbon steel truck frames are being supplied to New York Transit Authority by General Steel Castings Corporation. Cast nickel steel truck frames resist stress of swift accelerations and stops.

Truck horse! One-piece truck frame of cast nickel steel is all muscle

...reduces weight with thinner sections

A railroader's alloy...strong, fatigue-resisting, weight-saving: Nickel steel has exceptionally high strength, excellent shock resistance and may be readily welded. Truck frames of 2¼% nickel cast steel resist the physical shock of sudden impact and fatigue resulting from repeated stresses of high magnitude.

With nickel steel, designs that save appreciable weight are possible in equipment such as truck frames. The greater strength and shock resistance of the steels permit reduction of section thicknesses. The cast 2¼%, low carbon steel, normalized and tempered, easily meets the following specifications:

Tensile Strength	*75,000 psi*
Yield Point	*48,000 psi*
Elongation in 2"	*25.0%*
Reduction of Area	*50.0%*

32-page booklet yours for the asking. "Nickel Alloys in Railroad Equipment" shows how Nickel alloys are helping to lower operating costs and raise safety factors in diesel-electric and electric locomotives ... in passenger and freight cars. Write:

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N. Y.

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NICKEL ALLOYS PERFORM BETTER LONGER

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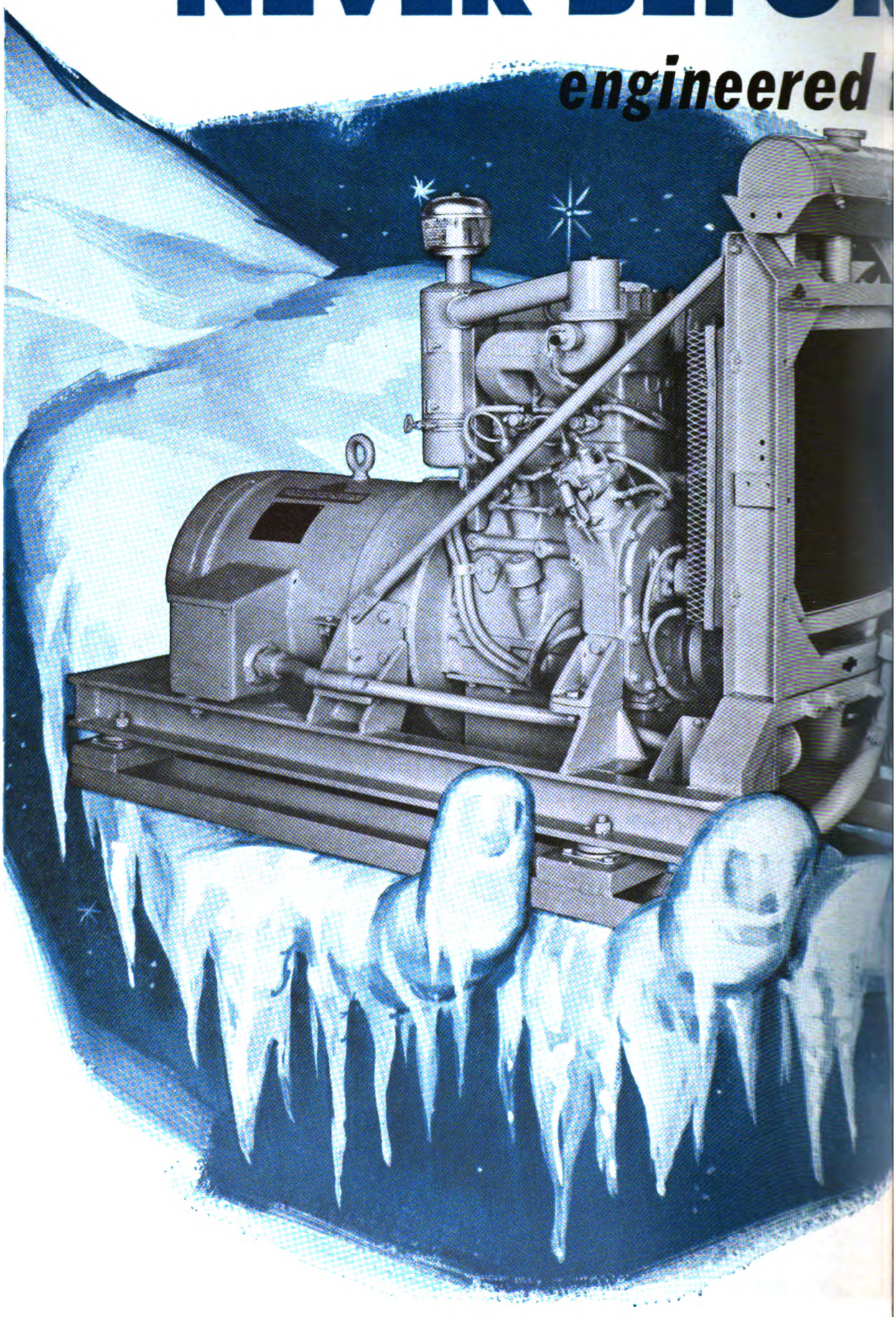
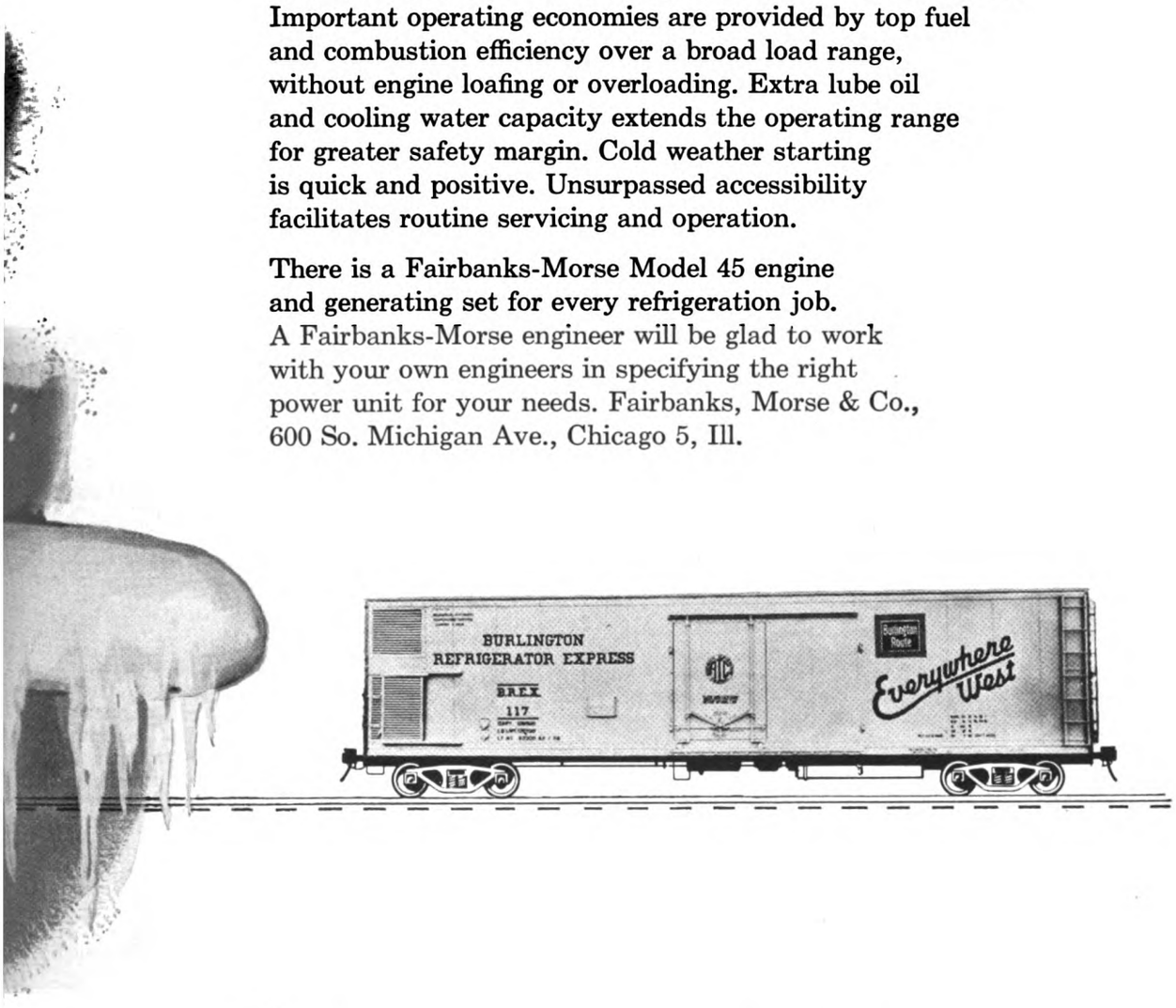


sel power so well
ntinuous unattended service...

Rugged, simple and compact—the new Fairbanks-Morse Model 45 Diesel is job-engineered for severest demands in railroad service.

Here is a heavy-duty engine and generating set ideal for new construction or conversions, for both 40 and 50 foot cars. Important operating economies are provided by top fuel and combustion efficiency over a broad load range, without engine loafing or overloading. Extra lube oil and cooling water capacity extends the operating range for greater safety margin. Cold weather starting is quick and positive. Unsurpassed accessibility facilitates routine servicing and operation.

There is a Fairbanks-Morse Model 45 engine and generating set for every refrigeration job. A Fairbanks-Morse engineer will be glad to work with your own engineers in specifying the right power unit for your needs. Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Ill.



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REPORT FOR JUNE—*Continued from page 8*

Ames, Westinghouse Electric; Modernization of Rapid Transit Car Control Equipment, by G. P. Purifoy, Westinghouse Electric; and Effect of High-Performance Rapid Transit Cars on Traction Substations, by E. J. Hogan and J. C. Price, General Electric.

National Railroad Apprenticeship Conference

The second annual National Railroad Apprenticeship onference to be held in St. Louis, Mo., will convene at the Statler-Hilton Hotel, July 16, 17 and 18. The tentative program for Thursday morning, July 17, calls for the discussion of (1) Use of Visual Aids and related instruction, and (2) Records and Record Keeping Systems. Ideas concerning the training of instructors will be discussed at the afternoon session. On Friday, July 18, officers of the Railroad Retirement Board will explain the over-riding benefits of railroad retirement as compared with Social Security benefits which a young man may look forward to receiving eventually.

In order to give recognition to apprentices in the railroad industry the apprenticeship conference is asking the railroads to select an outstanding apprentice from each craft to receive an award at the St. Louis meeting. In making the selection, the following guide is to be used: (a) The apprentice should be either in the sixth, seventh, or eighth period of his apprenticeship and be an active apprentice on the date of the conference; (b) consideration should be given to performance. attendance, attitude, progression on the job and in the classroom, and general all-around development of skill.

CNR Tests European Trucks

German-built passenger-car trucks with a new suspension system are being tested by the Canadian National. The all-welded, fabricated trucks are built by West German Carbuilders (Westwaggon), represented in Canada by the International Equipment Company.

The CNR has bought one car set of the German units and has been testing it on the Montreal-Toronto run. Railway mechanical experts are reported to have been impressed with the performance.

A car set of units somewhat similar to the Westwaggon products has been ordered by the CNR from another European firm, the Schindler Carriage & Wagon Co. of Switzerland. The trucks were tested in Switzerland before being shipped to Canada. They will be installed under a car for Canadian tests soon.

Orders and Inquiries For New Equipment

Only one railroad has placed orders for new equipment since the closing of the May issue. The Chicago, Milwaukee, St. Paul & Pacific has ordered 100 50-ton Airslide covered hopper cars and 500 50-ton box cars from General American and 500 50-ton box cars from Pullman-Standard, all for fall delivery.

However, the *Chicago & Eastern Illinois* is in the market for 1,000 hopper cars and may need still more before the end of the year, according to D. O. Mathews, president of the road. The *Chicago, Rock Island & Pacific* will convert 10 70-ton gondola cars to covered coil cars. Twenty similar cars are already in service. The *Lehigh Valley* plans to convert 37 55-ton hopper cars into flat cars for piggyback service. The *Northern Pacific* will place in service during 1958, 150 rebuilt logging cars and 200 stock cars converted from auto and box cars.

The *Central of New Jersey* has acquired four Budd RDC's from the New York, Susquehanna & Western.

Thread Machiners Claim Waste Cuts Cleaning Costs

Cotton thread wiping waste absorbs up to three to four times its own weight of oil. This was developed during a series of tests carried out by the Robert W. Hunt Co. for the Institute of Thread Machiners. The results of the laboratory tests confirm the greater absorption capacity of wiping waste compared with wiping cloths, according to W. R. Compton, executive director of ITM.

Samples were conditioned at 70 F and 65 percent relative humidity for 24 hr before testing. No. 1 colored cotton-thread waste absorbed SAE 10-20 oil to the extent of more than 400 percent of its conditioned weight. ommon wiping cloths absorbed less than 140 percent of their weight.

Good quality waste costs less initially, Mr. ompton said, and it can be used effectively longer than cloth or rags.

Hoglund Elected President AWS

Gustav O. Hoglund, head of the Welding Section of the Aluminum Company of America Process Development Laboratory has been elected president of the American Welding Society. Charles I. MacGuffie, manager of marketing of the Welding Department of the General Electric Company, has been elected first vice-president of the society.

Personal Mention

Bangor & Aroostook.—*Derby, Me.:* FRANCIS D. MURPHY, JR., appointed assistant mechanical superintendent, succeeding FRANK E. BAKER, retired. HAROLD W. HANSON appointed mechanical engineer, succeeding Mr. Murphy. DANA D. LOVELL appointed freight car foreman. HOLLIS E. CLARK appointed foreman car inspector, succeeding Mr. Lovell.

Boston & Maine.—*Westboro, N.H.:* HARRISON C. COOK appointed general foreman, New Hampshire engine terminal, succeeding ALBERT L. WOOD, retired.

Canadian Pacific.—*Penticton, B.C.:* L. F. CAMPBELL appointed locomotive foreman, succeeding J. MCGOWAN, retired. Moose Jaw, Sask.: R. M. NEIL appointed No. 1 shop foreman, succeeding Mr. Campbell. G. C. MYLES appointed relief foreman, succeeding Mr. Neil. Formerly No. 2 shop foreman, Kenora.

Chesapeake & Ohio.—*Richmond, Va.:* A. N. GILBERT appointed assistant to superintendent motive power, succeeding W. V. MOSELEY, retired. *St. Thomas, Ont.:* E. W. LOCKE, supervisor diesel locomotives, appointed mechanical supervisor, with jurisdiction over all mechanical matters on Canadian division, succeeding O. T. BUTCHER, retired.

Missouri Pacific.—*Dupo, Ill.:* M. H. LOSCH, master mechanic, retired.

Pennsylvania.—*Pitcairn, Pa.:* E. L. ARMS, appointed assistant enginehouse foreman. Formerly assistant enginehouse foreman at Enola, Pa.

Southern.—*Ludlow, Ky.:* GEORGE L. SOUTHER, JR., appointed master mechanic. WILLIAM W. WALLACE appointed general foreman. *Spencer, N.C.:* JACKSON B. YONGE appointed general foreman. MILTON S. RUBLE appointed foreman. *Chattanooga, Tenn.:* GILBERT B. HELTON appointed general foreman, system assembly shop. *Atlanta, Ga.:* ROBERT R. RAY, JR., appointed general foreman, Inman Yards. ROBERT B. MOWERY appointed assistant foreman. *Coster Shop, Knoxville, Tenn.:* CLARENCE E. KULDELL appointed production and material control engineer. JOHN R. MILLS appointed tools and methods engineer. *Greensboro, N.C.:* M. D. HUTCHINS appointed foreman.

Southern Pacific.—The Motive Power Department is now designated the Mechanical Department and titles of officers affected have been changed to conform.

Western Maryland.—*Baltimore:* C. J. WOLFE appointed assistant vice-president operations—mechanical. Former position of superintendent motive power abolished. *Hagerstown.* MAJ. GEORGE M. BEISCHER, assistant superintendent motive power, appointed chief mechanical officer.

New Oakite Liqui-Det sends car interior cleaning costs spiraling ...DOWN ...DOWN ...DOWN

... gives you the important advantage ...

low-cost end results

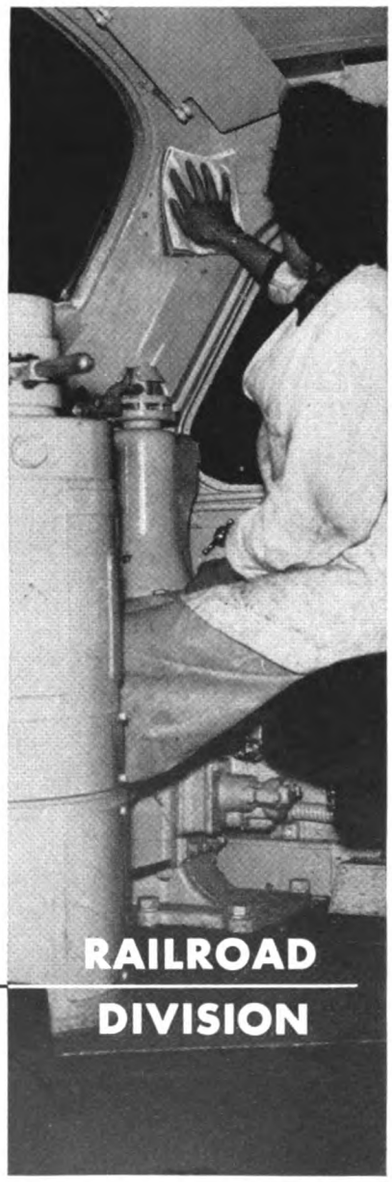
Floor to ceiling — that's where new Oakite Liqui-Det works to chase dirt from car interiors. This single, sudsing detergent renovates head and side linings, upholstery, trim, floors, and carpets alike ... frees the whole interior from clinging grime, and does it gently, safely, thoroughly.

Packaged in concentrated liquid form, Liqui-Det works at low concentrations for maximum economy. It forms a sudsy solution instantly. No need to stir, no waiting, no heating necessary. Works especially well in hard water.

While kind to fabrics, metals, wood, plastic, paint—even hands—it's geared for tough work, too. Used as a prespray on trucks, Liqui-Det requires no brushing, removes soil immediately, thoroughly.

Ask the local Oakite man to demonstrate. Or, send for details. Oakite Products, Inc., 46 Rector Street, New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE®
MATERIALS · METHODS · SERVICE
SCIENCE
In our 50th year



Cut cleaning costs? Solution is "modernize" not "eliminate"

"With maintenance pinched by cost-cutting programs, it could become quite a problem to keep up proper cleaning," says Sterling Killebrew, manager of the Railroad Division of Oakite Products. Inc.

"Reducing cleaning schedules is no answer. Cleaning is necessary from both an 'in-service' and a public relations viewpoint."

A better answer lies in more *effective* cleaning materials and in more *mechanization* of cleaning procedures, Mr. Killebrew said.

"Modern methods can improve car and locomotive appearance and keep up maintenance cleaning *without* adding manhours, and at *substantially lower costs.*" Mr. Killebrew cited several case histories.

Saves $2600 monthly, in car-washing costs

"One road switched from a so-called 'economy' product to an Oakite material in its automatic car washer. The Oakite cleaner loosened road dirt more thoroughly, eliminating costly hand-finishing. Yet, it worked at more dilute concentrations . . . actually *cost $2600 less* for one month's supply.

Mechanization cuts tank car cleaning by $1600

Another line, he said, cleaned 135 tank cars manually for $5200. By mechanizing the job, the same number was cleaned faster, more effectively, and with one-third the material consumption. Cost: $3600.

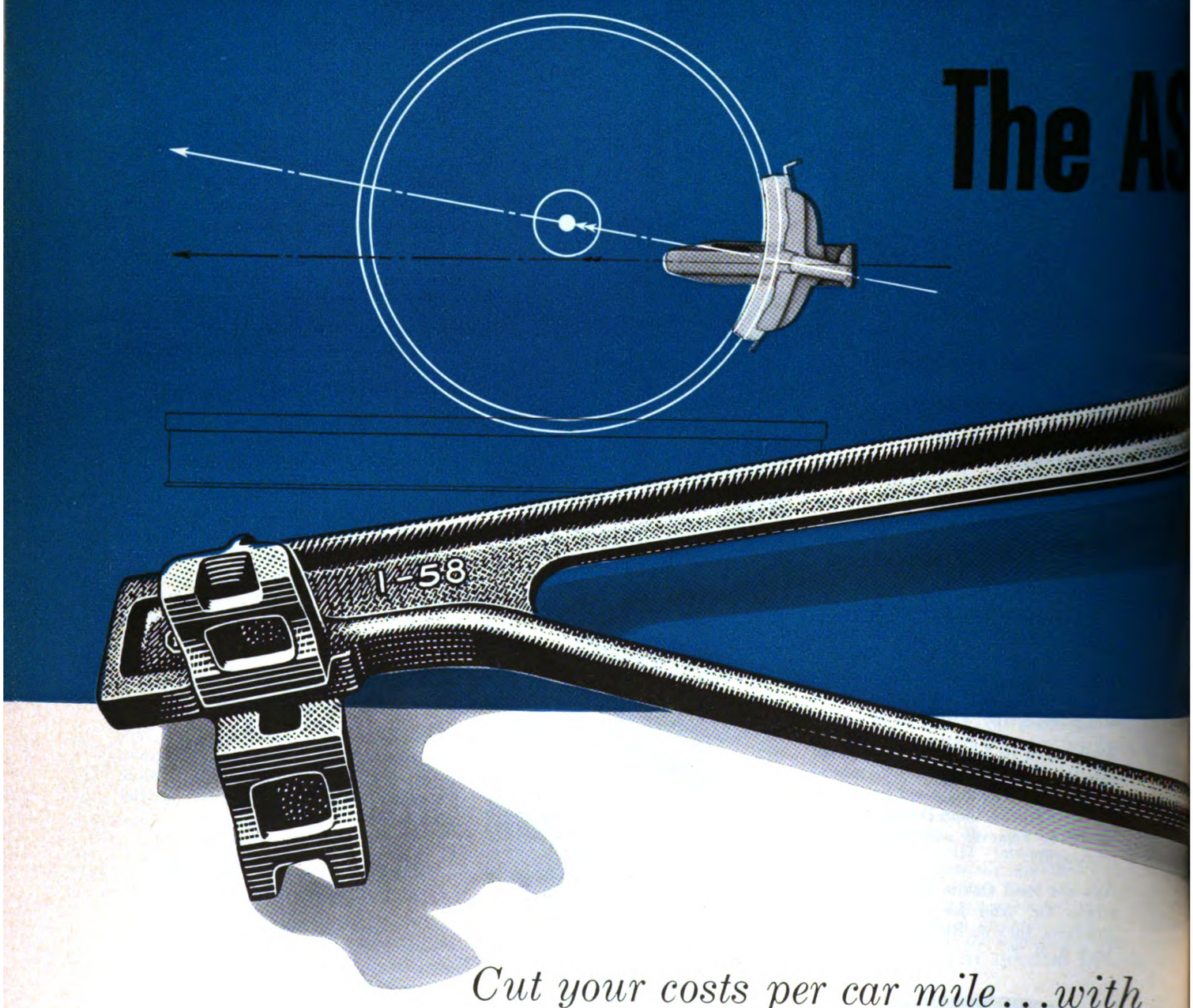
Quality Cleaner pays off at $800 a month

In a "cost-saving" move, a third road was using an "inexpensive" material for washing diesel exteriors. Cleaning one engine required 20 gallons of high-concentrate cleaning solution. Costing just pennies more per pound, an Oakite material gave them the same cleaning with only 5.6 gallons of low-concentrate solution. Net result: savings of $800 a month using the more "expensive" cleaner.

"Examples like these are common," Mr. Killebrew concluded. "Ask any Oakite man to tell you more."

NOW A.A.R

The AS



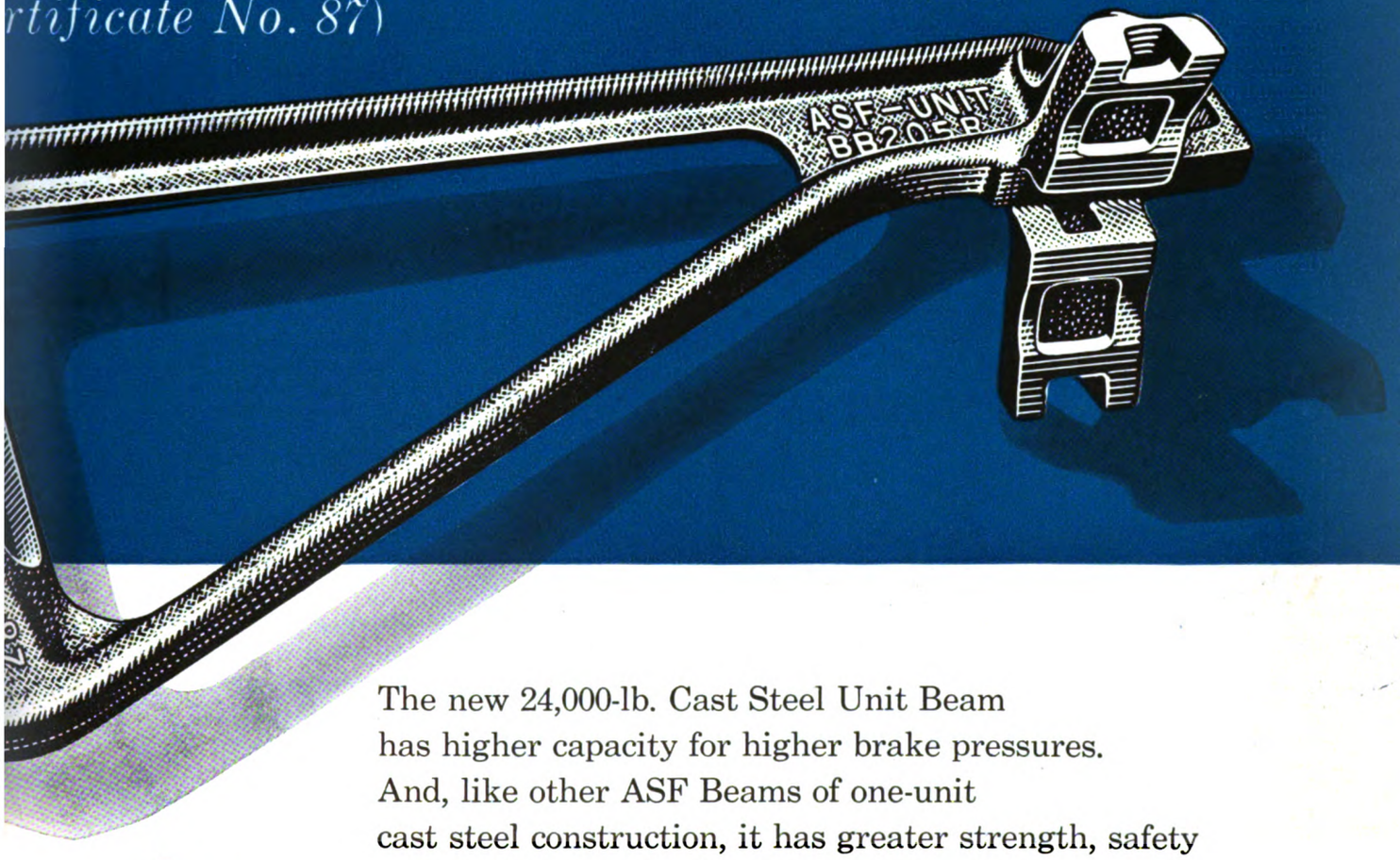
Cut your costs per car mile...with

ASF CAST STEEL UNIT BEAMS

STANDARD...

o. 24 cast steel unit beam

rtificate No. 87)



The new 24,000-lb. Cast Steel Unit Beam has higher capacity for higher brake pressures. And, like other ASF Beams of one-unit cast steel construction, it has greater strength, safety and rigidity . . . costs far less to maintain.

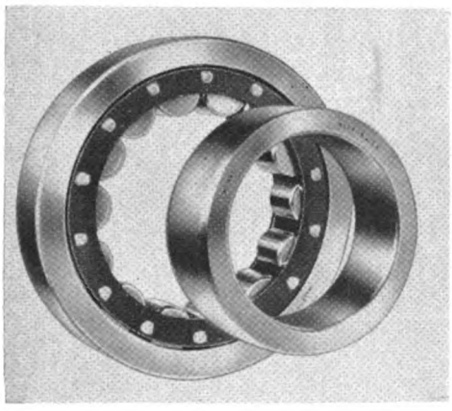
ASF

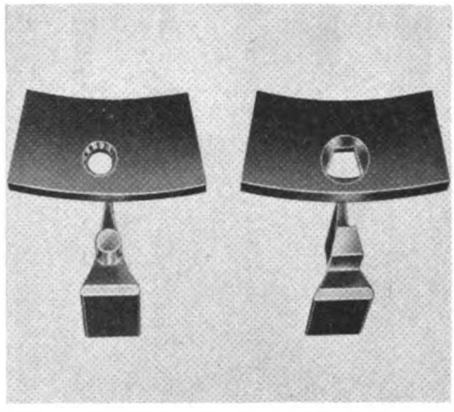
GEARED TO PROGRESS
PRI
TESTED

AMERICAN STEEL FOUNDRIES

Prudential Plaza, Chicago 1, Illinois

Canadian Sales: International Equipment Co., Ltd., Montreal 1, Quebec
Other Foreign Sales: American Steel Foundries, International, S. A., Chicago.



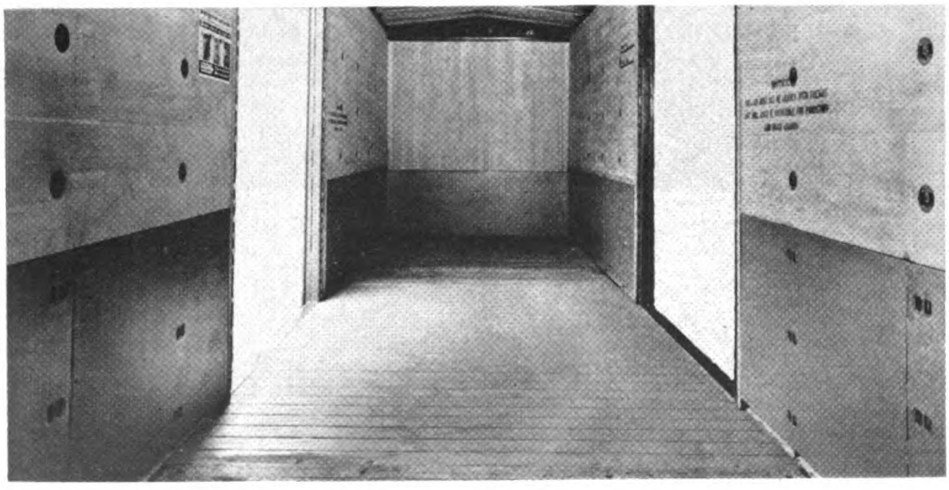


Traction Motor Armature Bearing

An improved pinion end bearing for traction motor armature shafts on diesel locomotives is currently being installed on new EMD locomotives, and is now available for all service and replacement requirements. The roller riding steel cage bearing introduced four years ago for this application has been improved with a new cage construction.

The cage bar shank, shown in one of the illustrations above, has been changed from a cylindrical (right) to a trapezoidal shape (left) to increase the cross-sectional area of the shank by 60 per cent. Holes in the cage end ring are made to conform with the shape of the shank and are adequately countersunk. This cage bar shank is self-locking, and strengthens the cage and the joint between the bars and the end rings. The bars are positioned more accurately.

Laboratory testing indicates this cage offers three times the life of the earlier design. Field testing also established increased bearing life. *Hyatt Bearings Div., General Motors Corporation, Dept. RLC, Harrison, N. J.*



Steel Lining for Box Cars

This metal box car lining is made from 3/16-in. steel sheet and is said to reduce contamination and reduce maintenance costs. The lining sheets also serve as gussets which strengthen the car.

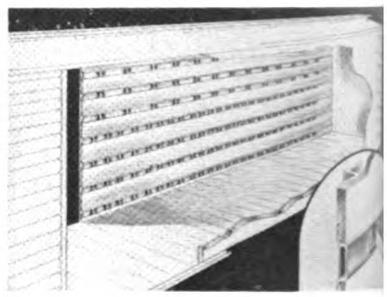
Lading band anchors in the lining over the side posts serve as spacers to place the surface of the steel sheet flush with the heavier wood lining used above. This makes the use of filler blocks unnecessary when applying this lining.

In the application shown, the sheets are 38 5/8-in. high and terminate 1 3/8-in. above the car floor. The material can be extended on up to the side and end plates of the car to eliminate the wood lining entirely, if desired. *Youngstown Steel Door Company, Dept. RLC, The Arcade, Cleveland 14.*

Grain Door Liner

Seal-Tite, a kraft paper grain door liner, is said to eliminate the need for grain door back-up reinforcing braces during grain shipment. The product is battened down a the grain door and fastened to the car fl and walls with paper lath.

One roll of paper is sufficient backing 20 grain doors. It can be applied on b doors of a car in 5 to 10 min. No caulk required. The paper is packaged in tw 7-ft by 8-ft sheets per roll. *J. J. Lipp Pa Company, Dept. RLC, 323 W. Polk Chicago 7.*



Strap Anchor Belt Rails

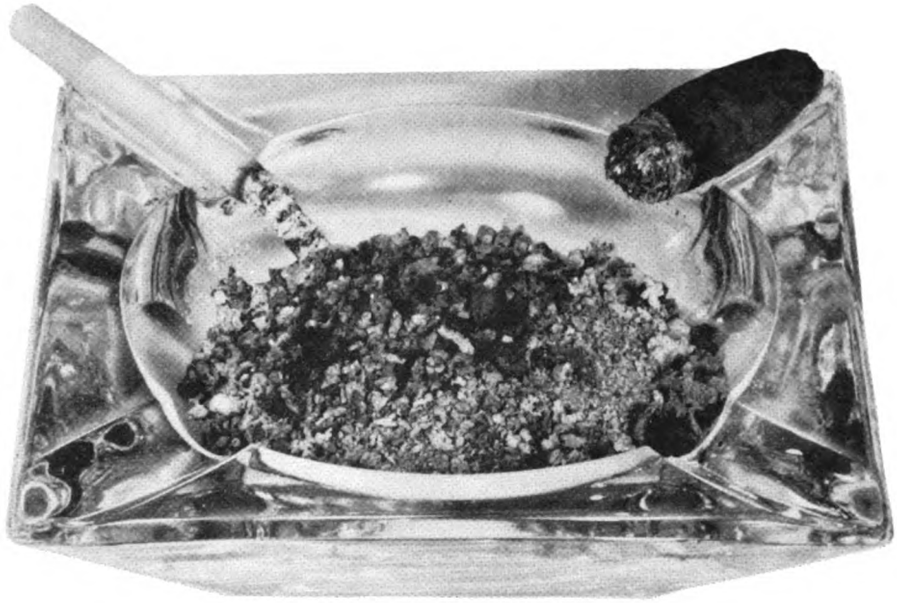
A permanent anchoring system for ne existing box cars, the Yocar "Safe Car was designed to overcome objections by railroads to excessive initial costs of instal tion. The "Safe Cargo" strap anchor bel can be installed during the relining proc replacing individual anchors. It may be pos ble through the use of these strap anchor rails to eliminate wood box car linings.

Tests conducted by Signode Steel Strapp Company of Chicago showed no evidence failure in any form. This test was cond following the installation of "Safe Carg a standard box car owned by a major ra road. The test car carried 44,000 lb of s strapping. *Youngstown Steel Car Corp Dept. RLC, Niles, Ohio.*

Hand Welding Torch

A Heliarc hand-welding torch, the HW has the cooling water passages molded torch head to give freedom from le Lighter and smaller, the torch body is

(*Continued on page 22*)



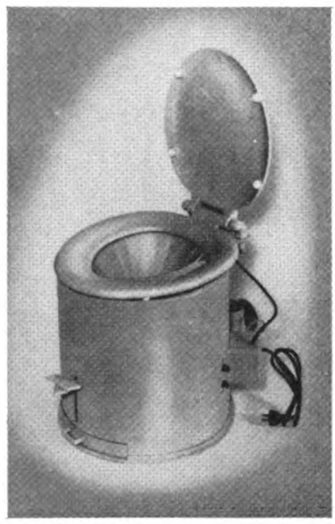
ELECTRIC-INCINERATING TOILET FOR RAILROAD USE NO MORE CARE THAN AN ASHTRAY!

The cigar and cigarette are real, but the ASH in the picture is from the ashpan of an INCINOLET—after two days of use.

INCINOLET is a waterless electric-incinerating toilet. INCINOLET works as a complete disposal plant, reducing all human waste to odorless, inorganic ASH – bacteria free.

INCINOLET eliminates waste disposal problems with scientific sanitation by electric incineration. It is the first sanitary toilet designed specifically to rid railroads of maintenance demands common to the chemical storage bucket and water closet. INCINOLET is perfectly adaptable for use on diesels, cabooses and work cars, and is easily and quickly installed by regular railroad maintenance men.

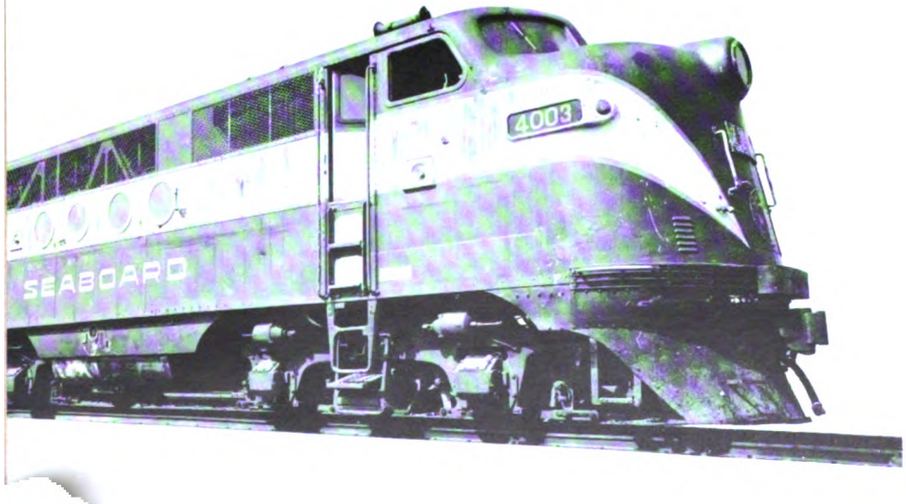
For complete details write Dr. E. Bayne Blankenship, president or . . . railroad representative: Ajax-Consolidated Company



INCINOLET – waterless toilet

RPMC

RESEARCH PRODUCTS MANUFACTURING COMPANY P.O. BOX 35164 • DALLAS 35, TEXAS



The General Purpose Locomotives shown above are two of the twenty GP's acquired in Seaboard's program thus far. The plan calls for additional FT freight locomotives, like the one on the left, to be turned in for similar GP units.

New locomotives for old . . .

The Seaboard *plans* its program of power renewal. This plan is based on turning in 16-year-old FT freight units on the purchase of new General Purpose locomotives containing certain manufactured components.

Thus, higher unit horsepower and greater versatility of the new GP's are achieved with much lower capital investment because of the turn-in value of the old locomotive.

How this or a similar plan might benefit your road's future can be had in detail from your Electro-Motive representative.

GENERAL MOTORS LOCOMOTIVES

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS

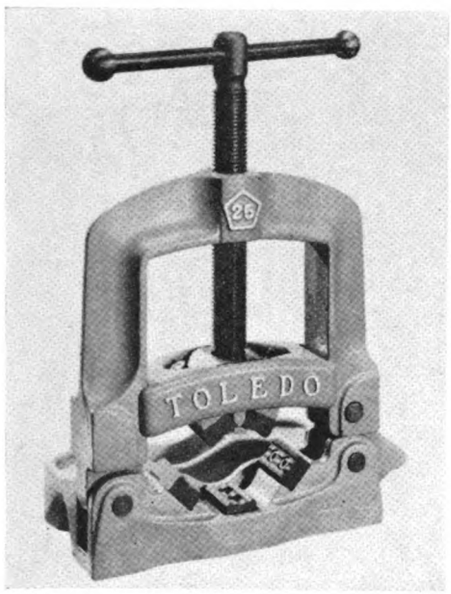
LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*

In Canada: General Motors Diesel Limited, London, Ontario

WHAT'S NEW IN EQUIPMENT—*Continued from page 18*

of heat-resistant Fiberglas reinforced phenolic. Gas cups for the torch have improved thermal shock and heat resistance, with impact strength four times greater than usual ceramic cups. For exceptionally hard use, metal sleeved cups are available.

The torch weighs 7 ounces. Design of collet bodies improves argon shielding, thereby conserving gas. An optional shut-off valve on the handle also conserves gas. *Linde Company, Division of Union Carbide Corporation, Dept. RLC, 30 E. 42nd st., New York 17.*



Pipe Vise

This ⅛- to 4½-in. capacity No. 25 vise has five jaws. Five jaws (instead of the conventional three) are said to give positive grip, regardless of pipe or conduit size, up to 4 in. This vise has a powerfully built frame, with large Acme screw threads which should result in longer service. *Toledo Pipe Threading Machine Company, Dep. RLC, 1445 Summit st., Toledo 4, Ohio.*

Diesel Lubricating Oil

A railroad diesel engine lubricating oil, Sunvis HD 340, is designed for the higher horsepower locomotive engines that are coming into use. At the same time, its use in the older locomotives is said to give savings in engine maintenance and lubricating oil costs.

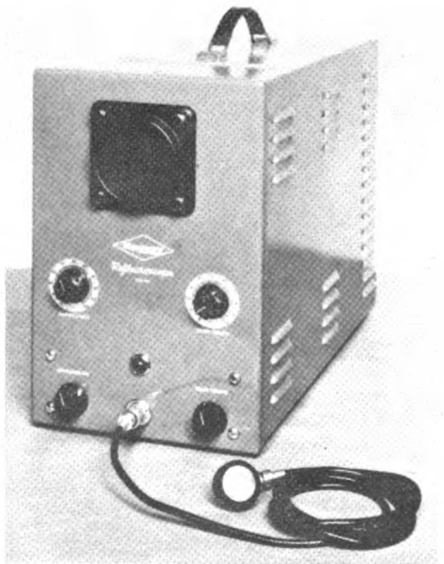
Laboratory and road tests in which it was compared with accepted oils were reported to show that HD 340 gives (1) good oxidation stability, (2) alkaline reserve for protection against corrosion by fuel sulfur, (3) low additive depletion, (4) bearing corrosion and wear resistance, and (5) low lubricating oil consumption.

In laboratory tests, Sunvis HD 340 not only oxidized less and was less corrosive to bearings, but its viscosity increased very little throughout the entire test period. Sunvis HD 340 was tested for 80,000 miles in freight service. The viscosity remained essentially constant, and the lead content remained consistently below 50 parts per million. A positive alkaline reserve was maintained throughout the road test and additive was not depleted. Insolubles stayed below 0.2 per cent.

The engine was inspected at the end of the test and it was found that pistons were clean, except for a highly polished coat of light tan lacquer. Groove filling was less than 40 per cent by volume, and there were no deposits under the crown. The air ports were less than 10 per cent restricted, and there was no sign of liner scuffing or ring sticking. *Industrial* Products Dept., *Sun Oil Company, Dept. RLC, 1608 Walnut st., Philadelphia 2.*

Aluminum Conductor Busway

The Type DE, a 225- to 1,000-amp plug-in Flex-A-Power busway with aluminum conductors is available both in three- and four-pole construction for three-wire, three-phase, or four-wire, three-phase applications. Type DE is designed for indoor use as a plug-in or feeder system in industrial plants and commercial buildings. It has a 50,000-amp RMS asymmetrical short circuit bracing as standard. *General Electric Company, Dept. RLC, Plainville, Conn.*



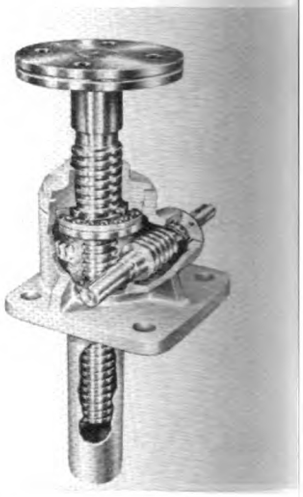
Portable Reflectoscope

The portable Type US reflectoscope operates at 2.25 megacycles and weighs 35 lb. It is approximately 9 in. wide by 19 in. deep by 14 in. high.

Field use is facilitated by simplification of controls to four knobs and the incorporation of high performance, bright picture easily read video trace. A single transistorized automatic alarm is readily attached. *Sperry Products, Inc., Dept. RLC, Danbury, Conn.*

Fiberglas Thermal Insulation

This Fiberglas product, known as AT-40 series transportation insulation, is designed for railway cars. The product is said to be highly resistant to slumping under conditions of repeated wetting, freezing, thawing or drying out; its resilience permits ease of handling; it can be snapped into place without need of support until the enclosing panels are installed; and the material completely fills the area to be insulated. *Owens-Corning Fiberglas Corporation, Dept. RLC, Toledo 1, Ohio.*



Worm Gear Jacks

The 1800 Series worm gear jacks are available in capacities of 2, 5, 10, 15, 20, 25, 50 and 100 tons. Worm gear jacks will hold heavy loads in position without creep. All eight models have a uniform rate of raise which permits jacks of varying capacities to be operated in unison on unevenly distributed loads. Raises up to 24 in. can be furnished. *Duff-Norton Company, Dept. RLC, P.O. Box 1889, Pittsburgh 30.*

Welding Wire

The Inco-Weld A wire brings to the inert-gas welding field the advantages for welding dissimilar metals which the Inco-Rod A electrode has made available for metal-arc welding. Inco-Rod A electrode, for metal-arc welding, will now be called Inco-Weld A electrode; the new inert-gas welding product will be called Inco-Weld A wire.

The wire has been designed to produce strong ductile joints in a large number of dissimilar metal combinations. Other features are its operability in all positions, a high strength and corrosion-resistant deposit, machinability, high impact resistance for sub-

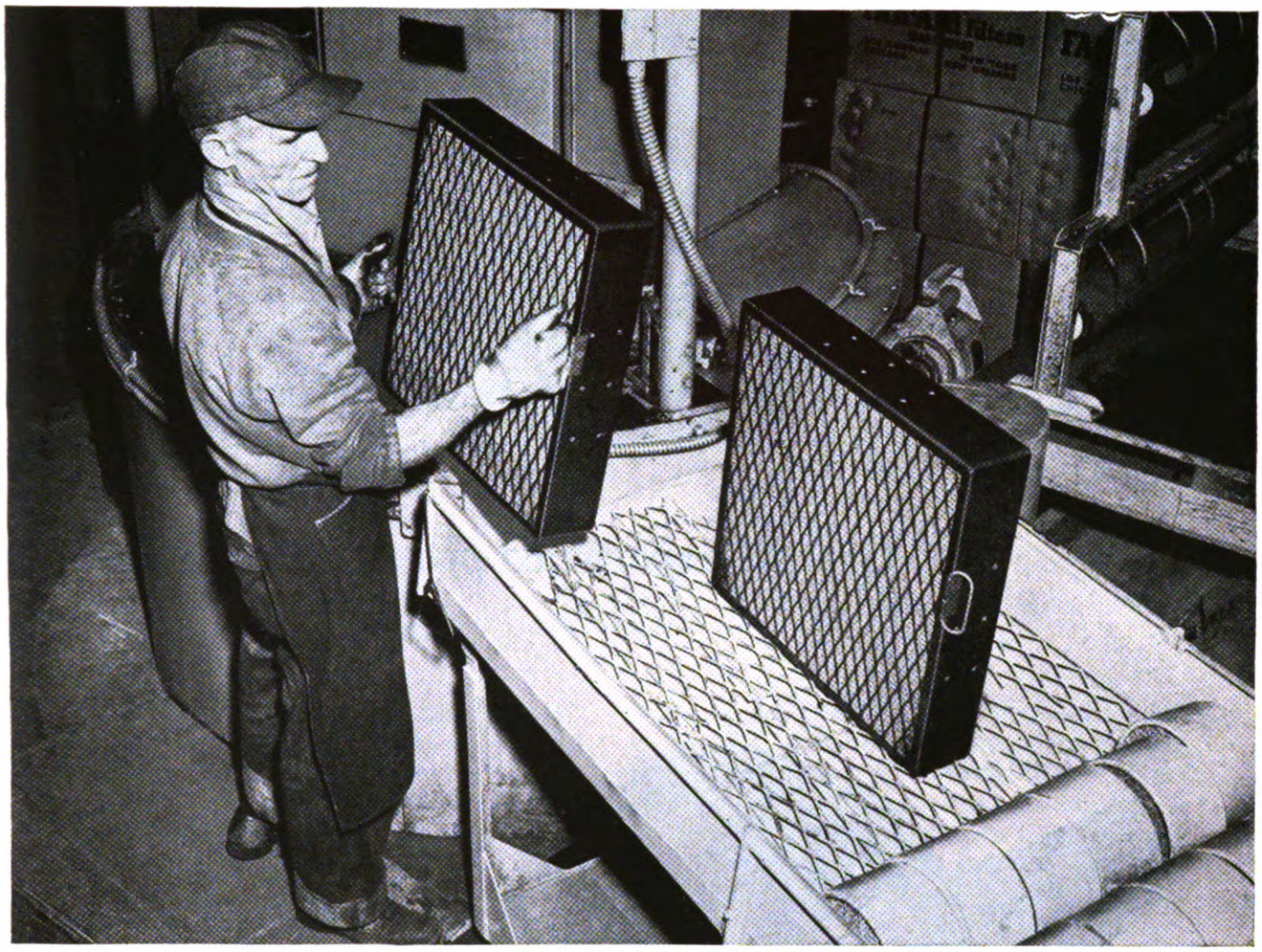
(*Continued on page 60*)

ENGINEER'S FIELD REPORT

PRODUCT CHEVRON FILTER COAT

FIRM FARR COMPANY
Los Angeles, Calif.

Air filter firm uses Chevron coating exclusively

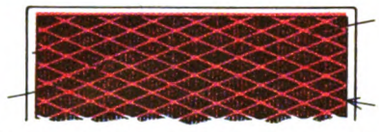


Farr Co. supplies impingement-type air filters, oiled with Chevron Filter Coat, to nearly all major railroads. A leader in air filtering, Farr has used Chevron Filter Coat (formerly Calol) exclusively for three years, since product was introduced.

Farr's Director of Research, S.F. Duncan, recommends gel-structure oils like Chevron Filter Coat because they improve filter efficiency. Other users report Chevron Filter Coat increases filtering efficiency as much as 50% over oils they previously used.

A heated centrifugal oiler of their own design (above) applies Chevron Filter Coat to all Far-Air filters just before they are packed for shipment. Filters are immersed in heated oil for 30 seconds, then raised and spun at 300 rpm for a minute to remove excess oil.

Why Chevron Filter Coat ups efficiency of air filters



- High wicking ability—quickly soaks dust particles
- Will not drip off screens—gives full filtering efficiency through entire service period
- Easily applied and cleaned—but will not wash off in service
- Does not separate, harden, or change properties in service
- Non-corrosive to metals

CHEVRON Industrial Lubricants

For More Information about this or other petroleum products, or the name of your nearest distributor, write or call any of the companies listed below.

TRADEMARK "CHEVRON" AND "CHEVRON" DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Franciso 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

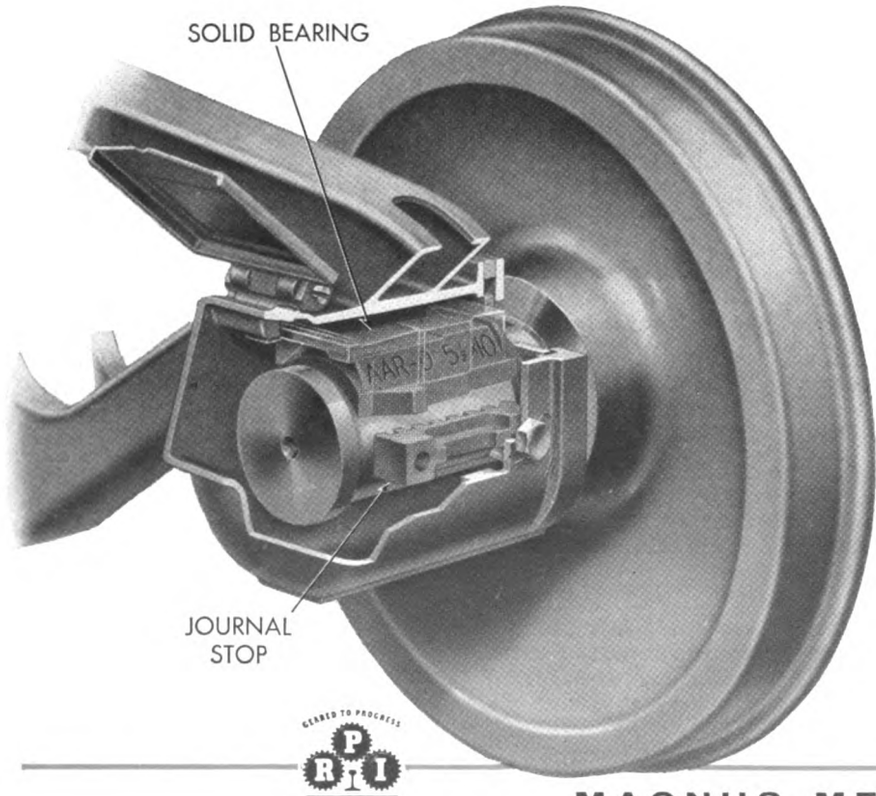
STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

HOW SOLID BEARINGS AND JOURNAL STOPS HELP KEEP

It's a fact...

that MAGNUS R-S JOURNAL STOPS
can cut hot boxes 90%—
save 43% on total bearing operating costs

Overall experience proves that Journal Stops
performance you want-



AAR SOLID BEARINGS

Simple
Dependable
Economical
Safe

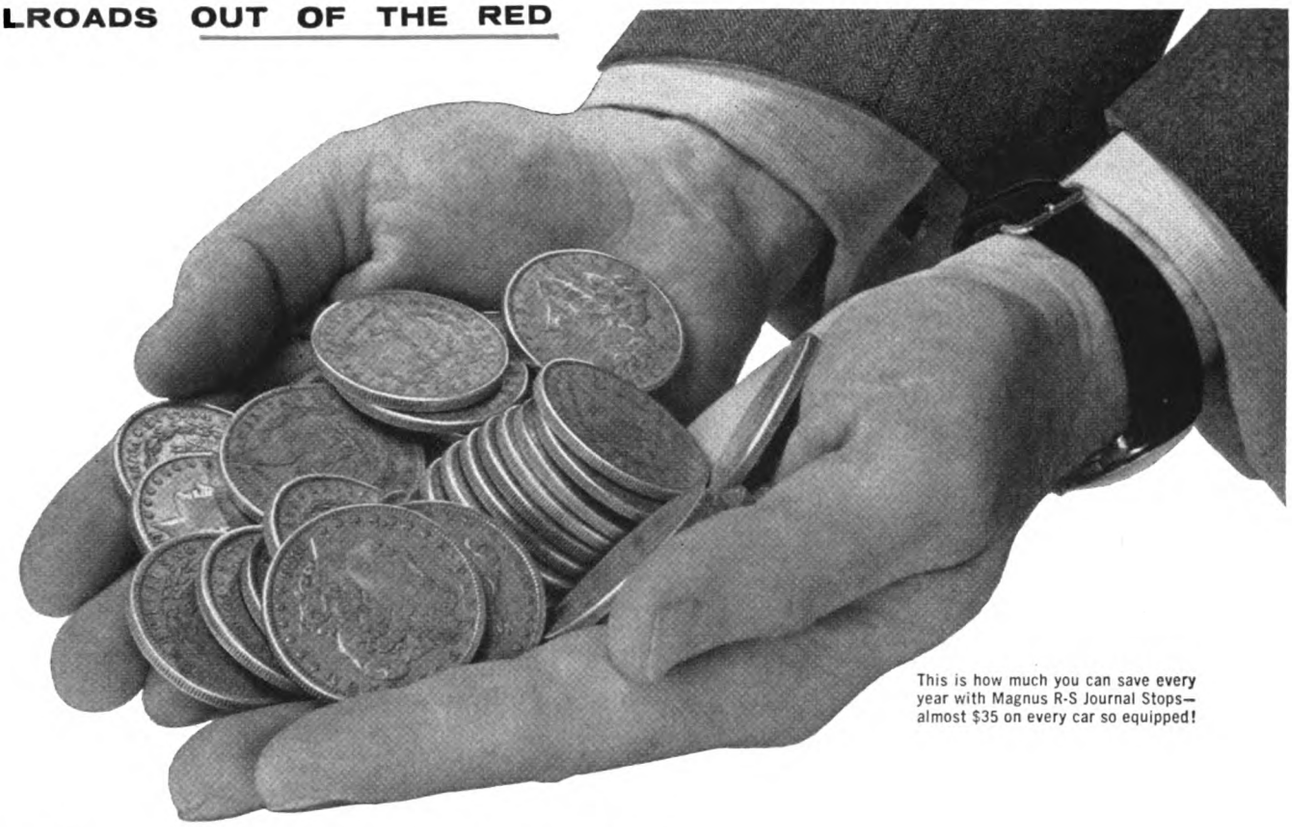
R-S JOURNAL STOPS

Permanent installation
Better bearing performance
Lower maintenance costs

GEARED TO PROGRESS
P
R I
LEADER

MAGNUS METAL CORPORATION

AILROADS OUT OF THE RED



This is how much you can save every year with Magnus R-S Journal Stops—almost $35 on every car so equipped!

ın give you the kind of bearing ıd pay for themselves in less than 3 years

R-S Journal Stops stabilize the entire journal bearing assembly. That eliminates 90% of the hot boxes — probably even more. You cut down the service attention required. Conservatively you double bearing and dust guard life. You reduce wheel flange wear and get more miles per axle too.

Right now you save almost $35.00 per car annually — pay the complete cost of the Stops, including installation, in less than three years. And bigger savings are sure to come. That's because R-S Journal Stops will help make possible a further extension of intervals between repacks. (Without Journal Stops the maximum extension won't be practicable). They'll make it easier to provide an effective rear seal, save on oil, still more on servicing.

Yes, R-S Journal Stops are the low-cost answer to hot boxes. And with them you still have all the many advantages that solid bearings bring to railroad rolling stock. You can take the maximum load, make the fastest schedule. Lading gets the smoothest ride. You save excess dead weight and get the lowest possible running resistance in pounds per ton. Best of all, with Journal Stops solid bearings can give the kind of performance you want at a price you can afford to pay.

Write us for *all* the facts . . . Magnus Metal Corporation, 111 Broadway, New York 6; or 80 East Jackson Boulevard, Chicago 4, Illinois.

MAGNUS

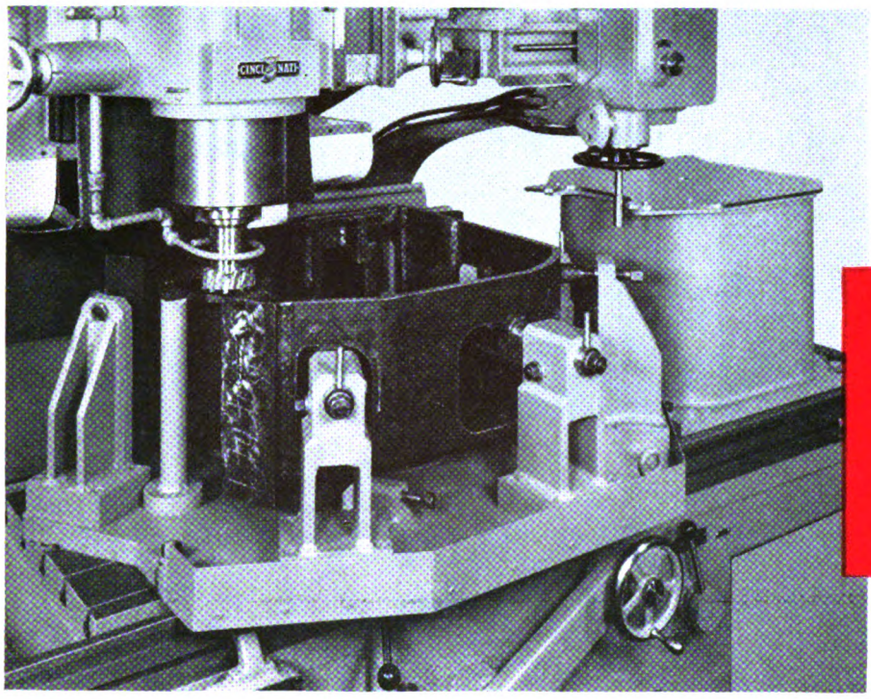
Solid Bearings

RIGHT FOR RAILROADS
. . . in performance . . . in cost

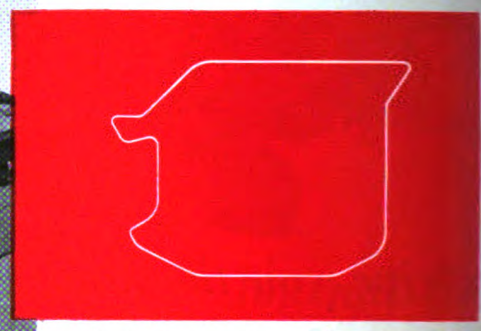
bsidiary of **NATIONAL LEAD COMPANY**

25" x 33" Profile

Milled Automatically on CINCINNATI 28" VERTICAL HYDRO-TEL



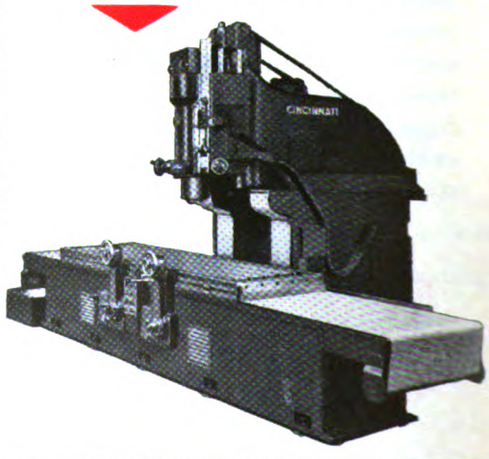
Entire profile edge of large weldment is automatically milled in one continuous cut, on this CINCINNATI 28" Vertical Hydro-Tel Milling Machine, equipped for 360° Automatic Profile Milling. Note how machine handwheels can be swiveled out of the way to accommodate overhang of large fixtures.



Variety of curves in the above template is scanned automatically by the tracing finger extending from the Hydro-Tel's 360° Automatic Profile unit.

There are two ways to mill large two-dimensional profiles. The hard way, when the operator uses two hands to control table and cross traverse, while keeping his eyes glued on the work and cutter. Or the easy low-cost way, automatic profile milling on a CINCINNATI 28" Vertical Hydro-Tel like the one illustrated here. This equipment greatly simplifies the operator's job. After he loads the fixture the automatic profiling unit takes charge of the operation, scanning the curvature of the template while automatically controlling the table and cross feed to mill the exact profile of the template. ¶ This production idea can be extended to profile mill two, three or four parts at one time, with the corresponding two-, three- or four-spindle head. There's no floor under costs when you plan your milling operations on a CINCINNATI Hydro-Tel. Cincinnati builds four machines of this type: 16", 28", 30", 36". All are "spec'd" in Sweet's Machine Tool File. Complete data for the 28" size may be obtained by writing for catalog No. M-1773-3.

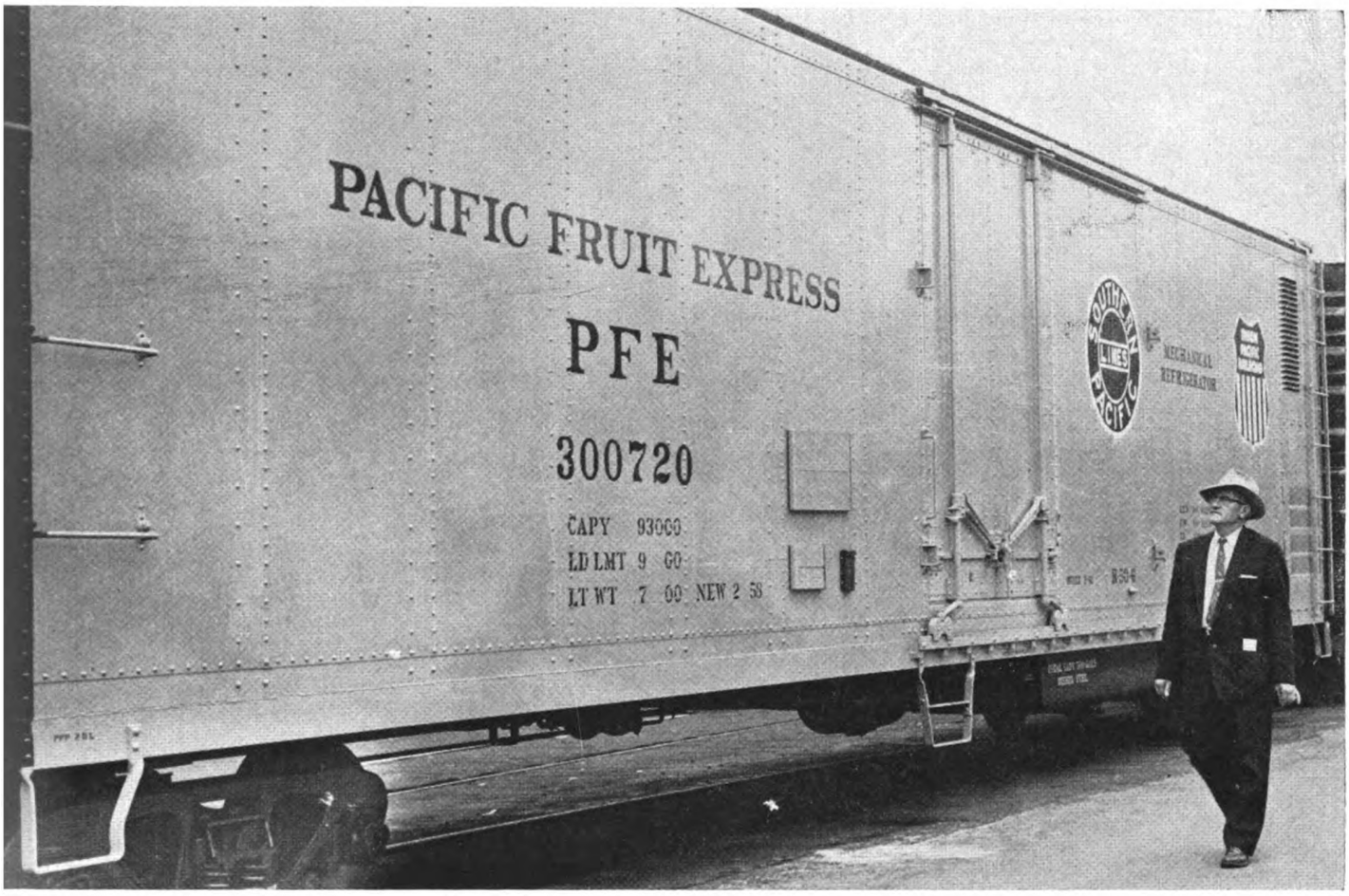
CINCINNATI 28" Vertical Hydro-Tel Milling Machine. General-purpose style illustrated. Can be equipped for die sinking and/or automatic profile milling, or multiple spindle production milling. Catalog No. M-1773-3.



THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

CINCINNATI®

MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • SPECIAL MACHINE TOOLS • METAL FORMING MACHINES HARDENING MACHINES • CUTTING FLUIDS • GRINDING WHEELS



fty-foot, 50-ton mechanical refrigerator car leaves PFE Los Angeles shop.

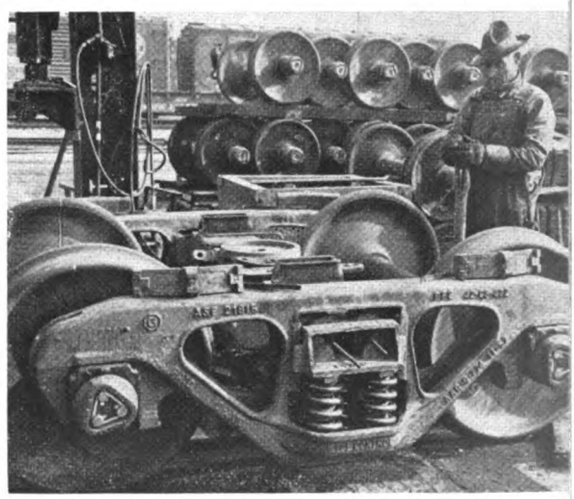
PFE Expands Mechanical Reefer Fleet

Over $20,000,000 will be spent for 1,000 "all purpose" cars this year and next

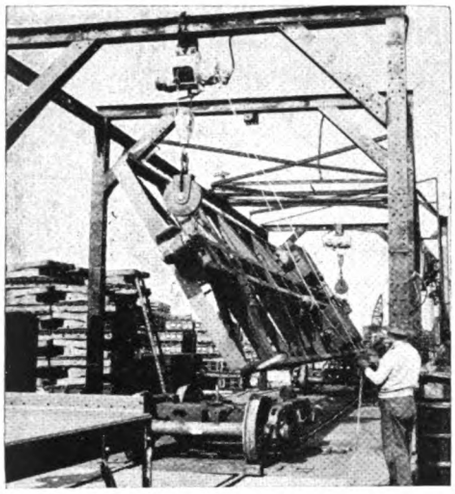
CONSTRUCTION is under way on ,000 all-purpose mechanical refriger- tor cars which Pacific Fruit Express jointly owned by the Southern Pacific nd the Union Pacific) ordered from its wn shop in Los Angeles, at a cost of iore than $20 million. The cars have ooling equipment and humidity controls or hauling not only frozen foods but esh fruit and vegetables to the east. arge sliding doors and metal floor acks permit easy mechanical loading of ierchandise for the return trip to the est coast, assuring maximum car utili- ation.

The first 500 cars will be "super-giant" 50-ft, 50-ton cars, and the second 500 will be 40-ft, 40-ton cars. The first sample 50-ft car was exhibited to a group of railway officers, supply men and refrigerator car line representatives on February 16. Cars then started rolling off the assembly line at the rate of two each day. Production has been increased progressively and cars are being released currently at the rate of four daily, with a working force of about 200 men.

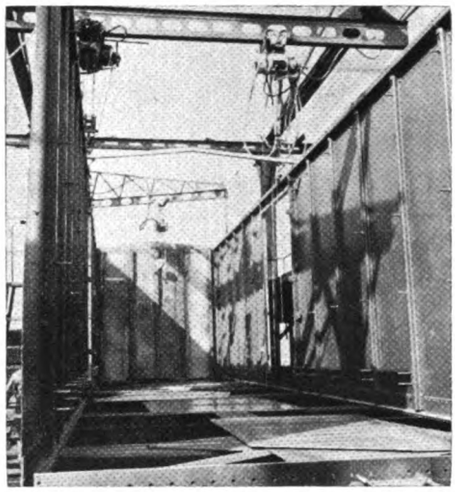
The last 50-ft cars are expected to be turned out of the shop by the end of August and will be followed by the 40-ft cars, scheduled for completion by



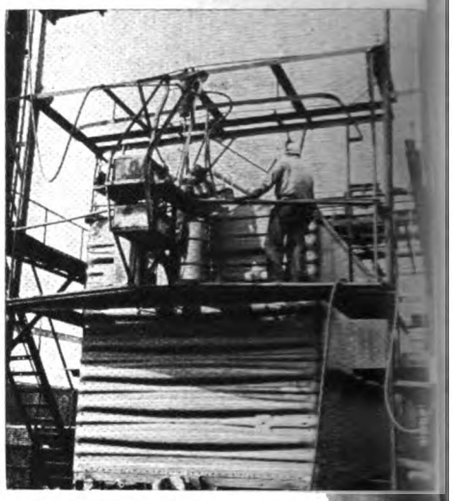
PFE carman assembles ASF truck. Buckeye CR's, National Malleable C-1's and Standard Car Truck Barbers are also used. All cars have Griffin cast steel wheels and Hyatt or Timken roller bearings.



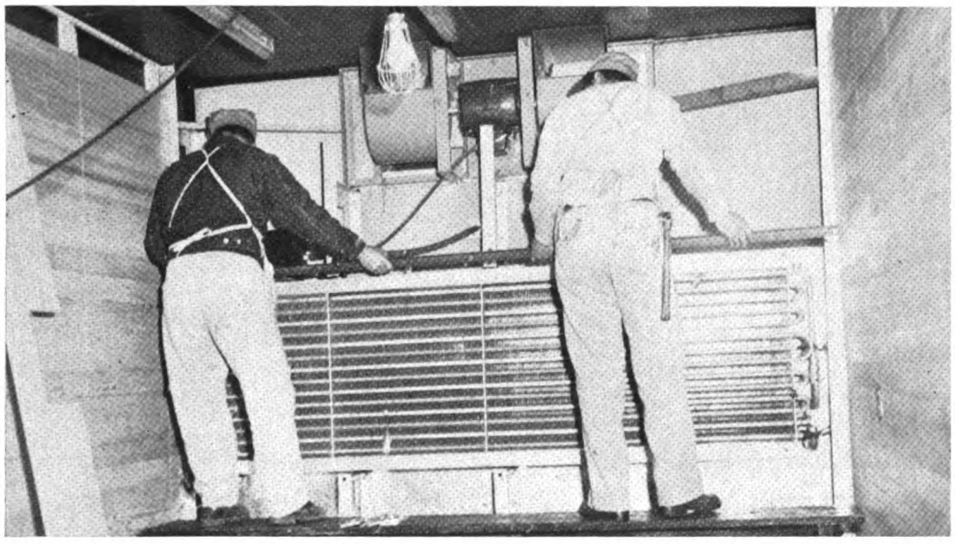
Welded underframes were supplied assembled. In inverted position PFE applies the underbody equipment including the two 250 gal fuel tanks, fuel strainers, air brake equipment, draft gears, couplers.



Car sides came from Youngstown Steel Door Co. ready for application to the underframes. The sliding side doors come from Camel Sales Co. and Superior Car Door Co.



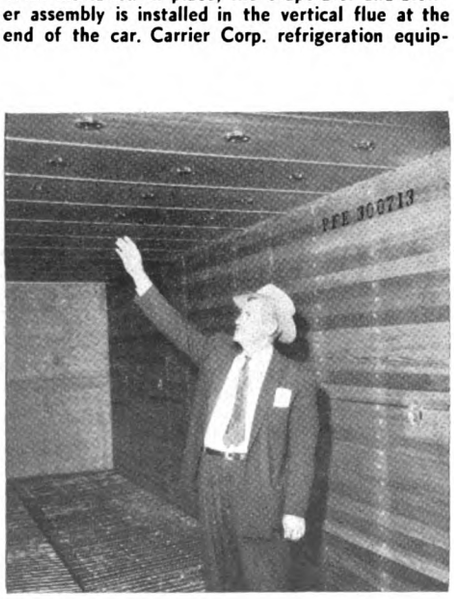
Elevator-mounted rivet heater and platform can be positioned for working on the Standard Railway Equipment car ends. The Standard roofs are applied and car is ready for insulation and lining.



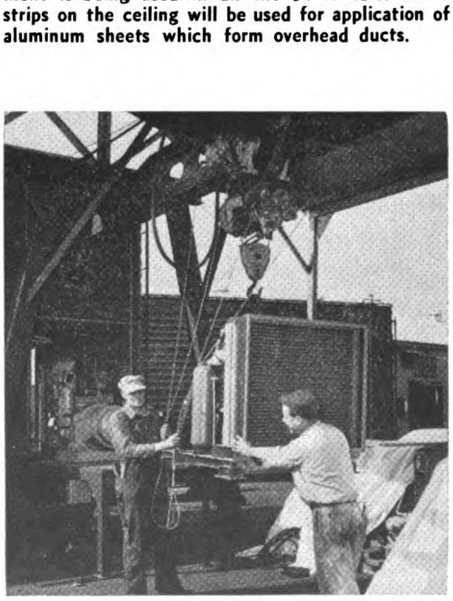
With insulation in place, the evaporator and blower assembly is installed in the vertical flue at the end of the car. Carrier Corp. refrigeration equipment is being used in all the 50-ft cars. Wood strips on the ceiling will be used for application of aluminum sheets which form overhead ducts.

Details of PFE Mechanical Refrigerator Cars

	50-ft cars	40-ft cars
Nominal capacity, lb	95,500	80,500
Light weight, lb	73,500	62,800
Loading capacity, cu ft	3,026	2,532
Inside length, ft-in.	44-6	35-4
Inside width, ft-in.	8-6	8-5
Height, floor rack to ceiling, ft	8	8
Width, side door openings, ft	6	6
Height, side door openings, ft	8	8
Insulation thicknesses, in.:		
Side walls	7	7
A (evaporator) end wall	8	8
B end wall	7	6
Roof	10.5	8
Floor	7	6



Diffusers in the aluminum ceiling feed air over the cargo. It then returns to the evaporator under the floor racks, which were supplied by Union Asbestos & Rubber Co. PFE installs lading strap anchors in side lining.



Carrier refrigeration equipment on the 500, 50-ft cars is powered from General Motors 34-hp diesel at the engine compartment door. Cars to be built later will have smaller Witte engine and lower capacity refrigeration system.

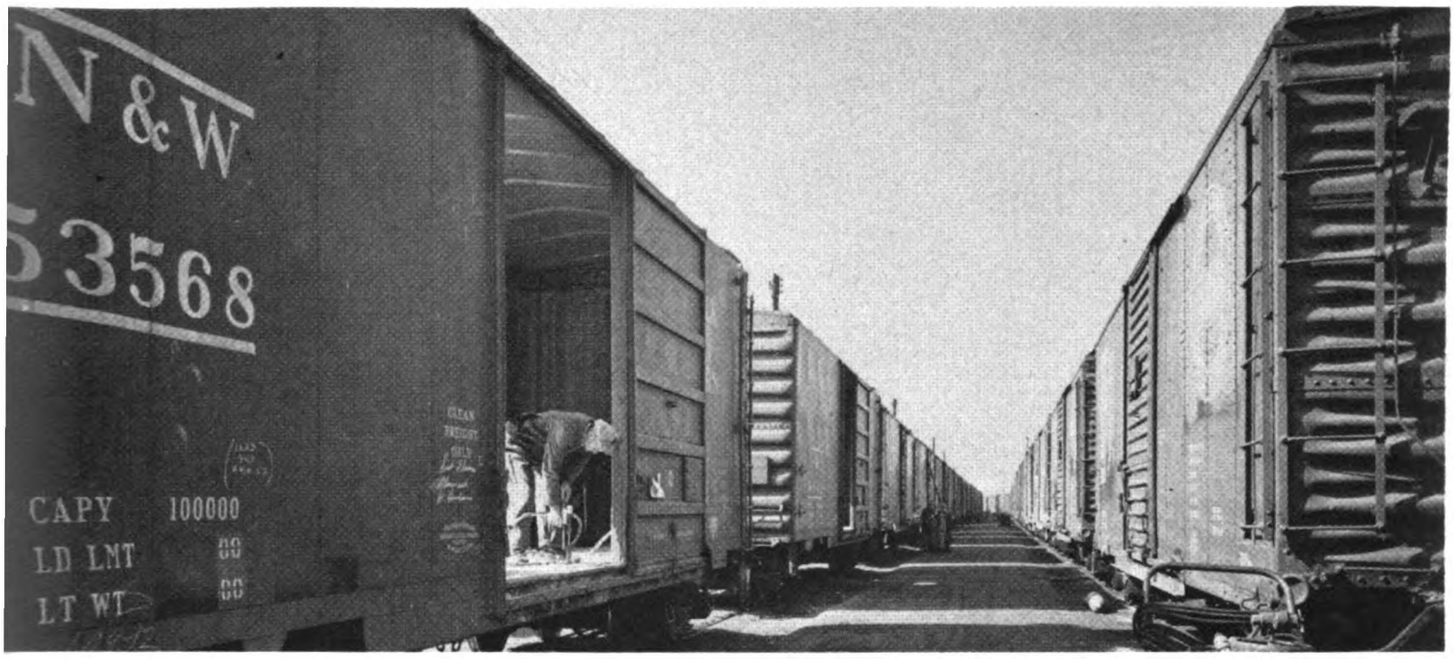
February 1959. After all these cars are placed in service, PFE will have a mechanical refrigerator car fleet of 1,714 cars. Its total ownership will be over 34,000 cars.

All 1,000 of the new cars will have all-welded steel underframes, riveted superstructures, and modern freight car trucks equipped with roller bearings and cast steel wheels. The 50-ft cars have 7 in. of insulation in the walls and floor and 10½ in. in the ceiling, compared with 6 in. in the walls and floor for the smaller cars and 8 in. in the ceiling. They are equipped with floor racks having metal slats and wood stringers, while the 40-ft cars will have hardwood slats on aluminum stringers. Sliding 6-ft side doors permit pallet loading with conventional lift trucks.

Versatile Refrigeration

Versatility of refrigeration units which allows hauling either frozen or medium-temperature perishable products in the

(*Continued on page 46*)



Shaffers Crossing car shop makes running and heavy repairs on about 150 cars per day. The automatic nailer is used when required, and labor savings amount to 16 man-hours per day.

Norfolk & Western Uses Automatic Nailers

ALTHOUGH MOST FLOOR and lining repairs to box cars at Shaffers Crossing shop of the Norfolk & Western call for patching, occasionally a car has to be relined or refloored completely. For the past two years, the N&W has been using a Powasert air-operated automatic nailer to do most of the nailing at this repair shop in Roanoke, Va.

It has been a man-hour and money saver. Before the railroad began using this nailer, the entire job was done manually with hammers and hatchets. After the machine was installed, a greater portion of the nailing has been done automatically, with an attractive saving in man-hours and costs.

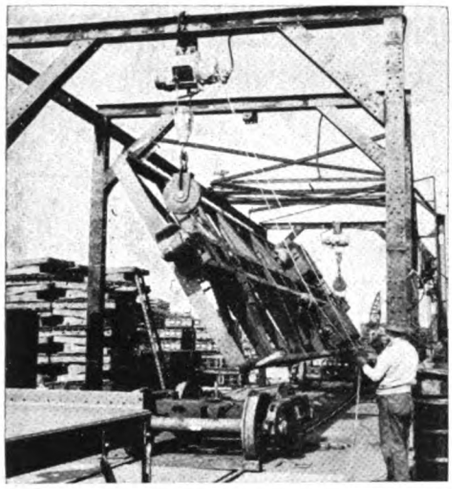
Using the Powasert for complete relining and subfloor jobs, one operator can nail 3.5 box cars in one 8-hr shift. Manual methods allowed one man to turn out only one car. For this complete re-flooring and re-lining, two men tear out the old material, and the new pre-cut plywood panels and lining boards are tacked in position. For floors, the N&W runs the new boards longitudinally in the car ends, and across the car in the doorway area. All this flooring is 7/8 x 5-in. material. Sides are covered with 5/8-in. plywood, and end lining boards are 13/16-in. x 5 3/4-in.

With all of the new material tacked in place, the nailer is used to drive approximately 1200 8-penny nails in the floor and walls of each car. Approximately 500 nails are driven in the floor. This Powasert nailer is made by the United Shoe Machinery Co.

A railroad spokesman stated that working with the Powasert is less tiring than the using of a hammer and working in uncomfortable positions. The manual methods meant that men inevitably became tired and slowed down as the day went on. Along with steady production, it was stated that an all-around better nail job is produced with Powasert. Nails are driven hard and true, with no heads sticking up. Because this nailer and its feeder-separator can be moved easily, it is used for most jobs which require the driving of nails. These include work car and caboose repairs, along with box car upgrading.

Based on the satisfactory performance at Shaffers Crossing, the N&W has purchased two additional nailers for use at other line shops.

Most cars needing replacement of a section of floor or lining have nails driven automatically when practicable. The operator makes his rounds behind repair gangs, driving nails after the boards are placed.



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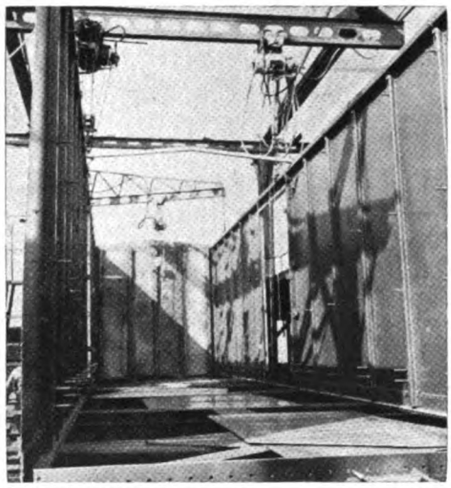

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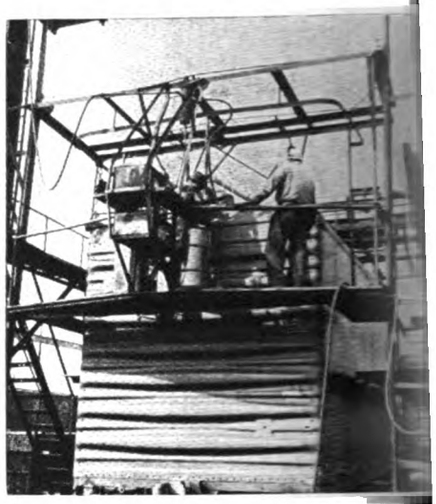

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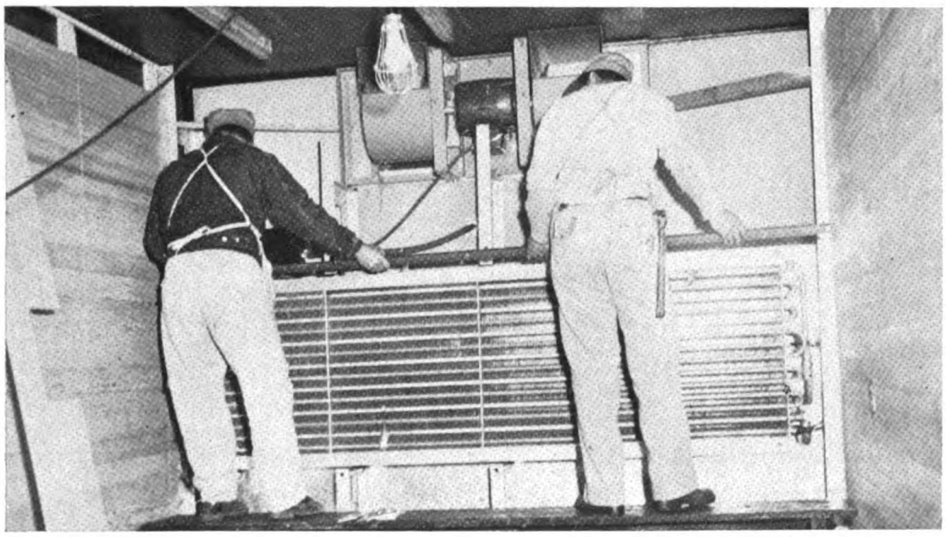

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Inside width, ft-in.	8-6	8-6
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Width, side door openings, ft	6	6
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Side walls	7	7
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B end wall	7	6
Roof	10.5	8
Floor	7	6

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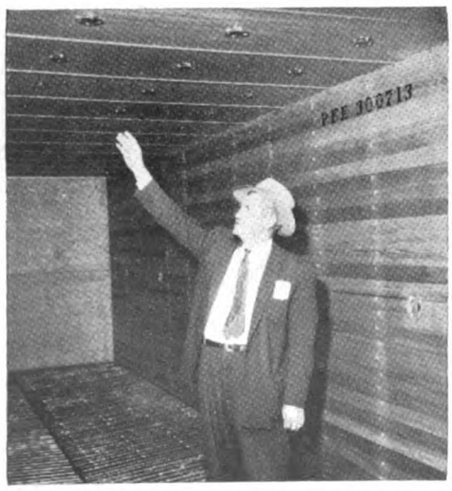
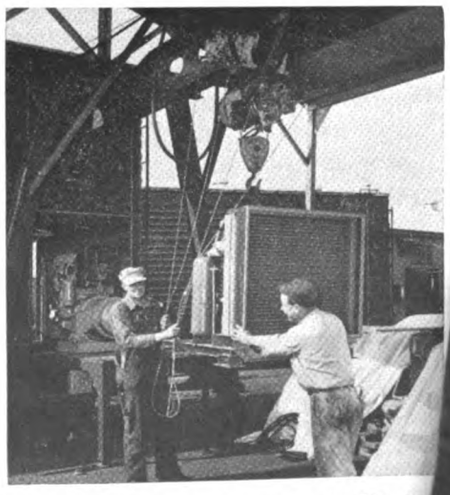
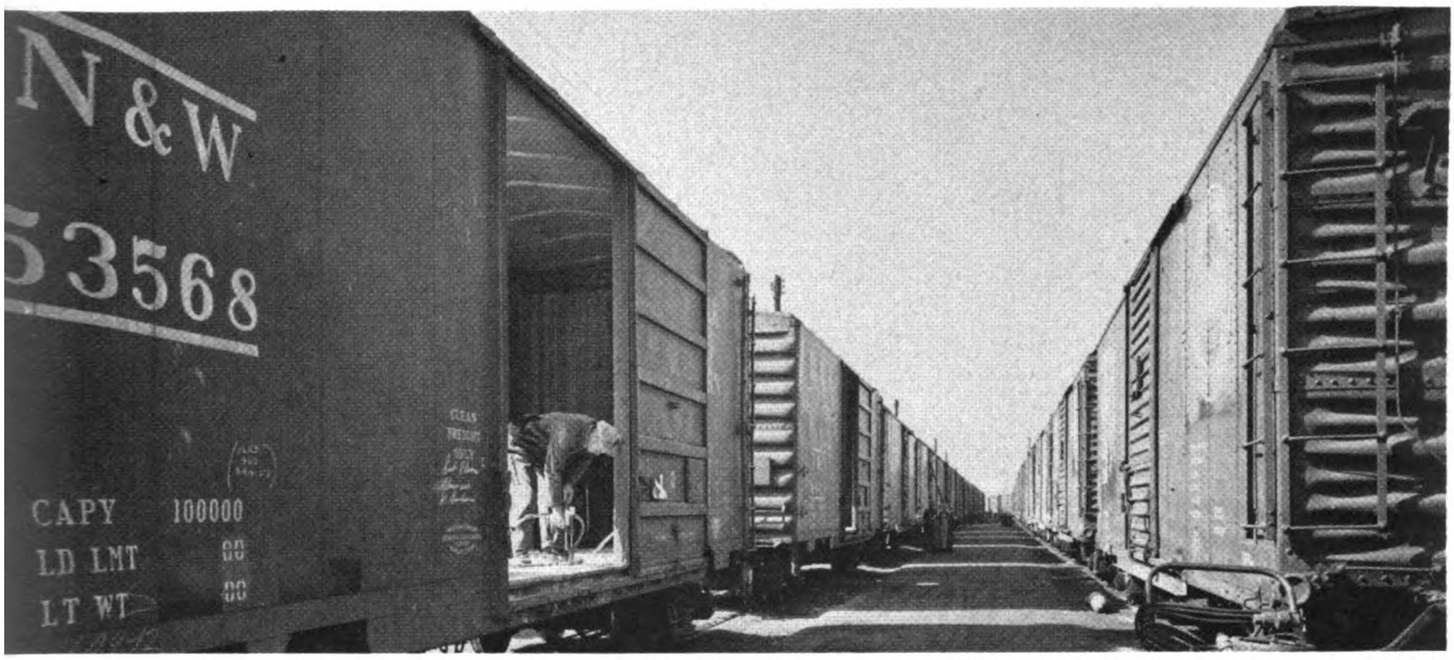


Diffusers in the aluminum ceiling feed air over the cargo. It then returns to the evaporator under the floor racks, which were supplied by Union Asbestos & Rubber Co. PFE installs lading strap anchors in side lining.



Carrier refrigeration equipment on the 500, 50- cars is powered from General Motors 34-hp d sel at the engine compartment door. Cars to built later will have smaller Witte engine and lo capacity refrigeration system.

R



Shaffers Crossing car shop makes running and heavy repairs on about 150 cars per day. The automatic nailer is used when required, and labor savings amount to 16 man-hours per day.

Norfolk & Western Uses Automatic Nailers

ALTHOUGH MOST FLOOR and lining repairs to box cars at Shaffers Crossing shop of the Norfolk & Western call for patching, occasionally a car has to be relined or refloored completely. For the past two years, the N&W has been using a Powasert air-operated automatic nailer to do most of the nailing at this repair shop in Roanoke, Va.

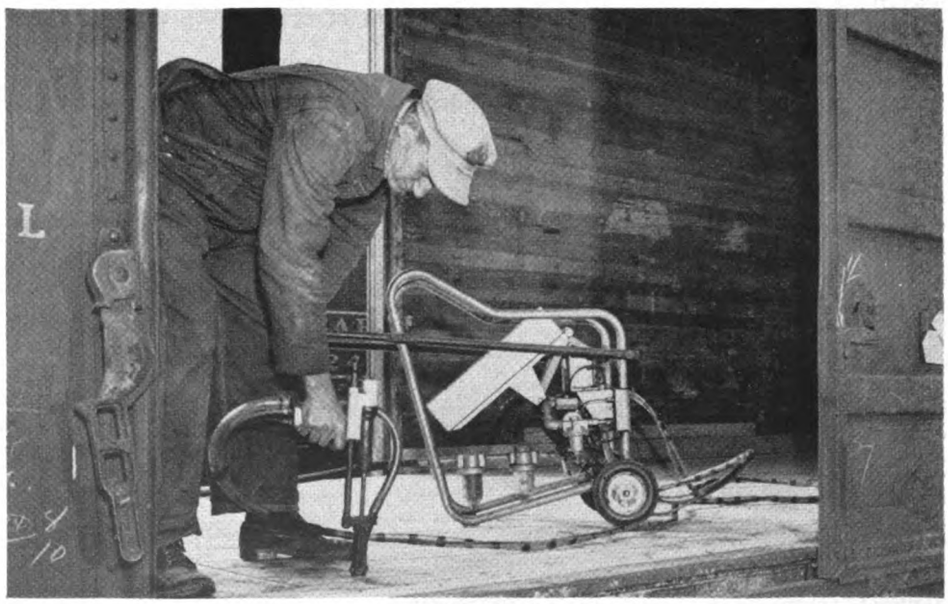
It has been a man-hour and money saver. Before the railroad began using this nailer, the entire job was done manually with hammers and hatchets. After the machine was installed, a greater portion of the nailing has been done automa with an attractive saving in m s and costs.

th rt for complete re- nd jobs, one operator 3 rs in one 8-hr shift. llowed one man to car. For this com- nd re-lining. en material, a w l panels ng ked in r or V runs t rds n the and n the d . All 7/8 x 5- Sides with 5/8 d, and oards a 5¾-in. of the l tacked nail drive ap- 12 ails in the w . Approxi- in the floor.

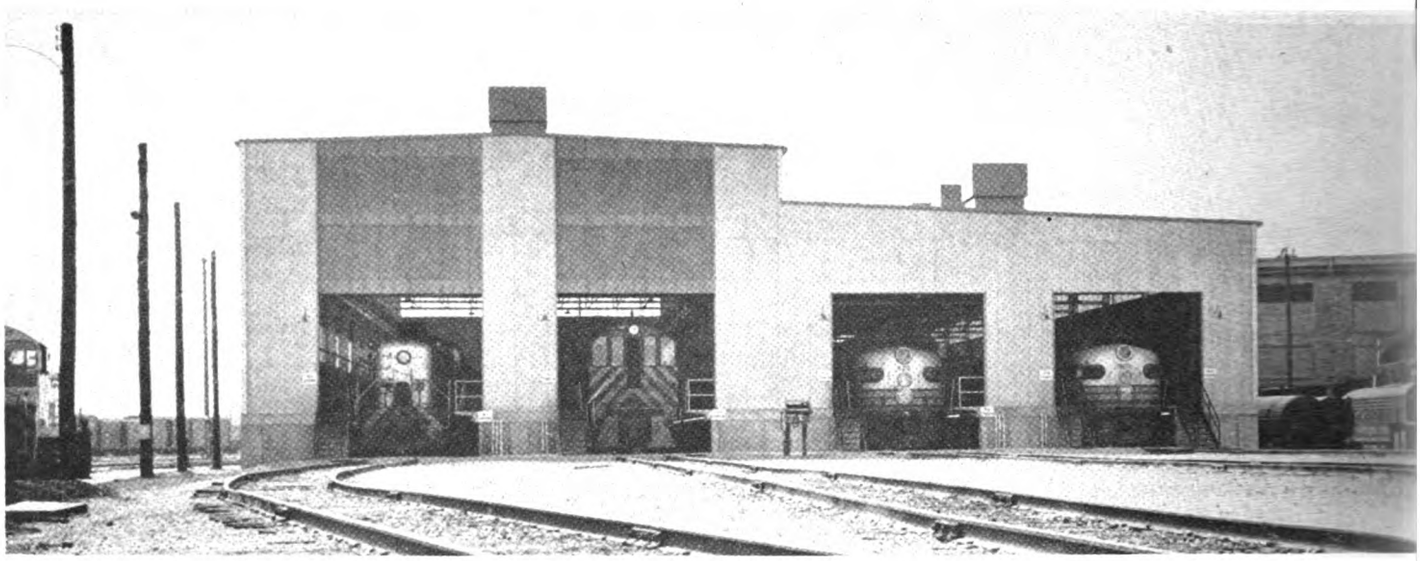
This Powasert nailer is made by the United Shoe Machinery Co.

A railroad spokesman stated that working with the Powasert is less tiring than the using of a hammer and working in uncomfortable positions. The manual methods meant that men inevitably became tired and slowed down as the day went on. Along with steady production, it was stated that an all-around better nail job is produced with Powasert. Nails are driven hard and true, with no heads sticking up. Because this nailer and its feeder-separator can be moved easily, it is used for most jobs which require the driving of nails. These include work car and caboose repairs, along with box car upgrading.

Based on the satisfactory performance at Shaffers Crossing, the N&W has purchased two additional nailers for use at other line shops.



Most cars needing replacement of a section of floor or lining have nails driven automatically when practicable. The operator makes his rounds behind repair gangs, driving nails after the boards are placed.



Two-level shop has depressed floors, pits and overhead cranes.

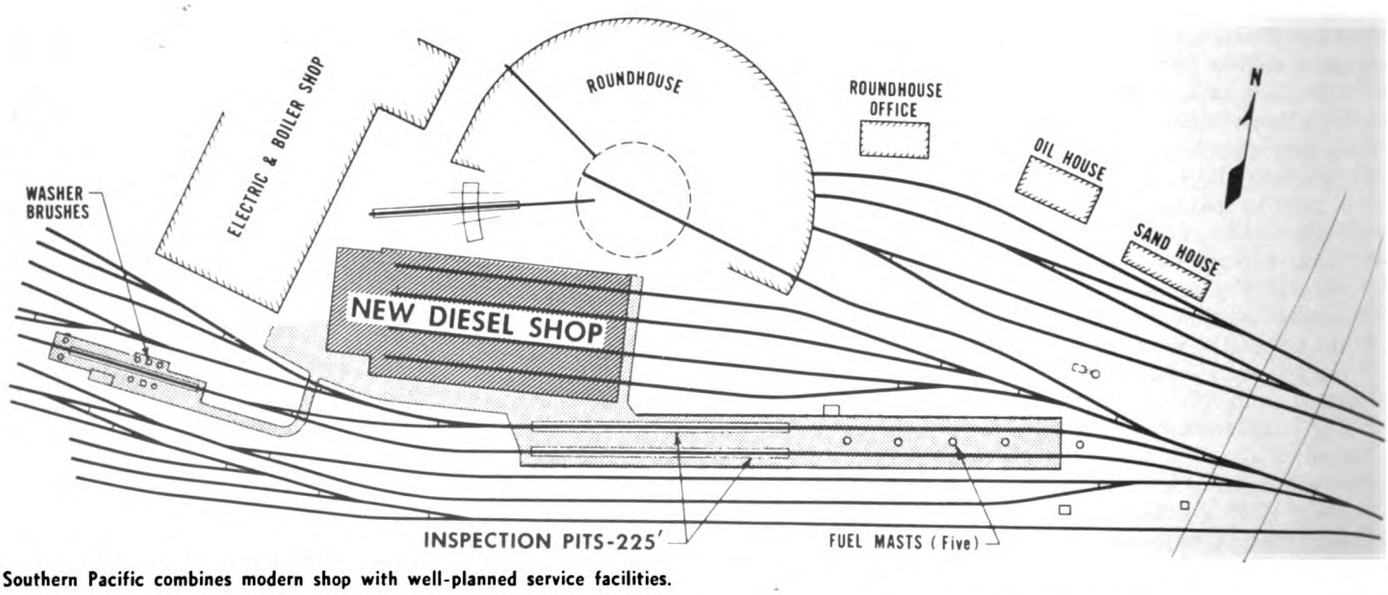
SP Terminal Speeds Diesel Servicing

THE SOUTHERN PACIFIC'S diesel light repair shop at Hardy Street Yard in Houston is the culmination of planning begun in 1953. After four years and at a cost of over $600,000, this complete modern plant includes washing, inspection, sanding and fueling facilities arranged on a through service basis.

The fire-resistant shop building, where light running repairs up to and including annual inspections are performed, is large enough to handle 16 units at a time. Built of steel and concrete, it measures 110 by 260 ft and is divided into two sections, each having two 200-ft service tracks. Four diesels can be handled simultaneously on each track. The shop has the conventional two-level concrete service platforms with depressed pits. The building also includes a shop area, room for filter cleaning and parts storage, and an air conditioned office with fluorescent lighting and acoustical ceilings at platform level. At ground level, the basement under this area furnishes additional storage space. The south section of shop is equipped with a 5-ton overhead crane. Each service platform is piped for treated water, and "dry" air is used for electrical equipment. Crank cases can be filled or drained anywhere along the four service tracks.

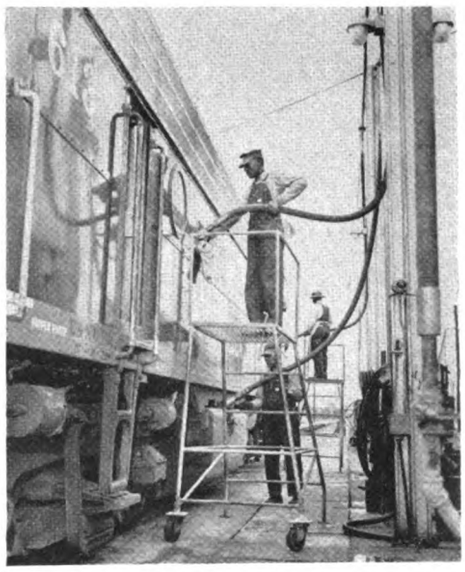
Twenty-two Hartzell automatic airjet exhaust ventilators keep the air pure in the shop, removing exhaust gases at a rate of 932,000 cfm. A complete change of air is made every 49 sec. Air enters the shop through louvers below the service platforms and is exhausted through the roof to provide complete coverage. There are nine Ventura-fan space heaters installed for winter. Daylight is provided by continuous bands of Corrulux translucent plastic in the transite sidewalls. Artificial light is obtained from a combination of incandescent, mercury vapor and fluorescent lights. Fire protection is provided by a high pressure fog pump, carbon dioxide and chemical fire extinguishers.

Automatic washing of diesel equipment is done on a 149-ft washing track where the locomotives get high pressure applications of chemical cleaning solution and a clear water rinse. Whiting Corporation motor-driven rotary brushes



Southern Pacific combines modern shop with well-planned service facilities.

High-intensity lighting facilitates night servicing and inspection.



Sand, water and lube oil outlets at each fuel mast.

remove the grime and dirt. Locomotives leaving the washer can go to either of two 225-ft-long concrete inspection pits, and then directly to sanding and fueling operations which are done simultaneously on either of two 200-ft tracks. The SP dries sand by using a shop made rotary sand dryer fired with natural gas. Five fuel masts are provided, each column composed of a 3-in. supply pipe reduced to 2-in. with a control valve 3 ft from ground level, 2-in. by 10-ft diesel fuel hose, 2-in. return bend and a 2-in. by 11-ft fuel hose fitted with Poage No. 500 coupling. This equipment is supported by a ¼-in. cable fastened to return bend through a pulley in a 6-in. WI pipe to a lead weight which supports the weight of hose. Ice storage capacity of 1,200 lb is provided at east end of servicing tracks. After servicing, the locomotives are placed on one of two ready tracks for dispatching.

The shop operates 365 days per year, with some 224 men divided into three shifts handling inspection, servicing and repair of about 83 diesel units per day. All locomotives are assigned to a general pool. An average of 12 annual, 27 quarterly and 93 monthly inspections are made each month.

Five men are assigned to a monthly inspection, six for a quarterly and eight for an annual inspection. Annual work is done on either of the two tracks in bay equipped with the 5-ton crane. A check list is used for each inspection from daily through annual. Of the 83 units handled, all repairs up to and including annual inspections are classified as light repairs. This consists of usual routine running repairs and inspection. In addition, power assemblies are changed out for defects such as slick or broken rings, cracked pistons, high piston-to-head clearance, and worn bearings are replaced. Some accident repairs are done in the running repair shop.

Wheel and truck work is done in the general shop, usually on a unit exchange basis. Wheels are also turned in the general shop.

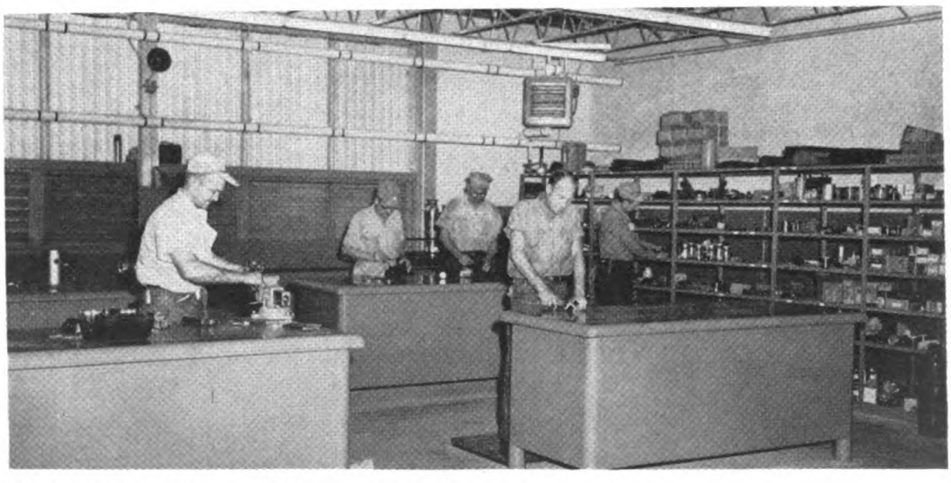
Other exchange units include, air compressors, turbo chargers, roots blowers, radiator cores, auxiliary generators, lubricating oil coolers, motor-generator sets, and engine governors.

The filter cleaning room is equipped with a Farr washer, a shop-made dryer, and a Paxton-Mitchell filter oiler for servicing impingement type filters. Lubricating oil is tested once every four days in the chemical laboratory, with changes controlled by analyses. A complete oil change is made at each annual inspection. A shop-made pump is used for flushing the lube oil system. The old oil is collected and reclaimed by an outside company.

Shop equipment includes Sweeney power wrenches, Thor impact wrenches and special EMD and Alco tools. Testing equipment includes an a-c dielectric tester, Kiene peak pressure indicators, Biddle Megger, EMD and Weston ammeters, voltmeter and milliammeter. Also available is a shop-made m-u control and dynamic brake cable tester equipped with an electric Megger and 40-amp load potential, and an EMD-mg set for transition setting.

Material racks are provided for fast moving items. Special carts and pallets are used for handling material and supplies. All material used in regular routine service is delivered by the stores department in large quantities to keep handling costs at a minimum.

The entire plant is equipped with two-way loud speakers from the shop foreman's office. Extensive yard lighting facilities have been provided. Built under traffic, the project also required the retiring of a major portion of the old roundhouse, relocating nearly two miles of track, and re-laying of thousands of feet of fuel, water and power lines.



Well-arranged bench area stocks fast moving repair items.

R. G. May

R. L. Dearmont

H. C. Wyatt

K. H. Tuggle

Program for 1958 Annual Meetings

Mechanical Division and Electrical Section

Operations and Maintenance Department — — Association of American Railroads

Hotel Sherman, Chicago

TUESDAY, June 24, 1958

Joint Session—Ballroom, 10:00 a.m.

Address by R. L. Dearmont, President, Missouri Pacific
Address by R. G. May, Vice President, Operations and Maintenance Department

Mechanical Division—Ballroom, Hotel Sherman

TUESDAY, June 24, 1958

FIRST DAY (Convening after Joint Session)

Address by Chairman C. E. Pond
Business Meeting
Report of General Committee
Report on Mechanical Research
Discussion of Committee Reports on:
- Locomotives
- Lubricants and Fuel for Diesel Locomotives
- Axles
- Geared Hand Brakes
- Specifications for Materials
- Safety Appliances

WEDNESDAY, June 25, 1958

SECOND DAY (9:30 a.m.)

Address by H. C. Wyatt, Vice President and General Manager, Norfolk & Western
Address by W. M. Keller, Vice-President, Research Department, AAR
Discussion of Reports on:
- Arbitration
- Prices for Labor and Materials
- Car Construction
- Loading Rules
- Forest Products Loading
- Brakes and Brake Equipment
- Couplers and Draft Gears

THURSDAY, June 26, 1958

THIRD DAY (9:30 a.m.)

Address by Hon. Kenneth H. Tuggle, member, Interstate Commerce Commission
Discussion of Reports on:
- Wheels
- Tank Cars
- Journal Roller Bearings
- Lubrication of Cars and Locomotives

Electrical Section—Louis XVI Room, Hotel Sherman

MORNING SESSION (Convening after Joint Session)

Address by Chairman C. R. Bland
Business Meeting
Report of representative on Mechanical Division Locomotive Committee
Report of representative on Mechanical Division Passenger Car
Report of representative on Mechanical Division Passenger Car Specification Committee

AFTERNOON SESSION (2:00 p.m.)

Report of Committee 1—Car Electrical Equipment
Report of Committee 3—Air Conditioning and Refrigeration

MORNING SESSION (9:00 a.m.)

Report of Committee 3—Air Conditioning and Refrigeration (continued)
Report of Committee 4—Motors and Control
Report of Committee 5—Illumination
Report of Committee 6—Welding and Cutting
Report of Committee 7—Automotive Electric Rolling Stock

AFTERNOON SESSION (2:00 p.m.)

Report of Committee 8—Power Supply
Report of Committee 10—Wire, Cable and Insulating Materials
Report of Committee 11—Electric Heating
Report of Committee 12—Electric and Diesel-Electric Locomotive Facilities and Procedures

MORNING SESSION (9:00 a.m.)

Report of Representatives to the ASTM
Report of Representative to the ASA
Report of Committee 14—Safety
Report of Committee 15—Relations With Public Utilities
Report of Representative to the NESA
Report of Committee 17—Application of Radio and Communication Systems to Rolling Stock
Report of Committee 18—Wiring Diagrams for Rolling Stock

How Mechanical Division Is Organized

C. E. Pond
Chairman

F. Peronto
Exec. Vice-Chairman

STANDARDS AND PROCEDURES for which the AAR Mechanical Division is responsible make possible speedy, uninterrupted freight car interchange throughout most of North America. The mandatory, recommended, and suggested methods and arrangements developed by the 21 standing committees and 5 special committees of the division apply not only to freight cars, but also to passenger cars and locomotives. All of this is done under the jurisdiction of the General Committee now headed by C. E. Pond and composed of the 15 senior mechanical officers shown below.

These activities involve much administrative work which is handled by the staff of the Mechanical Division under Fred Peronto, executive vice-chairman, at the headquarters at 59 East Van Buren street, Chicago. Letter ballots, sur-

General Committee

C. E. Pond, Chairman S. M. Houston, Vice Chairman

S. M. Houston
Gen. S.M.P.
SP

T. T. Blickle
Gen. Mgr., Mech. Dept.
AT&SF

L. R. Christy
Chief Mech. Officer
MP

R. E. Franklin
Asst. Vice-Pres.
Southern

L. E. Gingerich
Chief Mech. Officer
PRR

J. W. Hawthorne
Gen. S.M.P. and E.
ACL

J. H. Heron
Chief Mech. Officer
GN

W. F. Kascal
Asst. Vice-Pres.—Equip.
NYC

E. A. Kuhn
Chief Mech. Officer
C&O

D. S. Neuhart
Gen. Supt. M.P. and M.
UP

F. B. Rykoskey
Gen. Supt. M. P. and E.
B&O

J. A. Welsch
Gen. Sup. M.P.
IC

C. N. Wiggins
Chief Mech. Officer
L&N

E. Wynne
Chief of M.P. and C.E.
CNR

veys, and clarifications of Interchange Code rules are typical of the activities.

The office of the secretary edits, publishes and distributes all the division's committee-approved publications including the Code of Interchange Rules, Wheel and Axle Manual, Manual of Standard and Recommended Practice, Lubrication Manual, and loading rule pamphlets. The Mechanical Inspection Department, which works with the individual member roads, is also a part of the division staff.

A major project of the Arbitration Committee, assigned to a special working committee during the past two years, has been the simplification and condensation of the Interchange Rules. Already some revisions are in effect and some parts have been eliminated. The committee settles disputes submitted by subscribes to the AAR Interchange Agreement, and handles the routine revision of interchange rules.

The Committee on Prices for Labor and Materials semi-annually receives material prices from representative railroads and computes the charges in the price rules of the Interchange Code. It solicits and computes per-pound prices covering rebuilt cars and makes field studies covering necessary price change.

The Committee on Car Construction studies and investigates the design, construction and maintenance of freight cars and their components. It controls new freight car designs and handles approval tests of important parts.

The Committee on Brakes and Brake Equipment has jurisdiction in the design and maintenance of the various types of air brake equipment used on freight and passenger cars and locomotives. Air-brake instruction pamphlets distributed by the manufacturers are completely under brake committee control.

The Committee on Lubrication of Cars and Locomotives collaborates with the manufacturers in investigations and approval tests of roller-bearing greases and journal-lubricating devices. The arrangement, lubrication and maintenance of the AAR journal boxes are supervised by this group.

The Committee on Safety Appliances works as a liaison group between the railroad industry and the Interstate Commerce Commission which controls the application of devices under the Safety Appliance Act. The Committee on Tank Cars works closely with the Bureau of Explosives in tank car design.

The loading rule committees work with railroads, shipper groups and individual shippers. The other committees control the standards, approval and testing of the car and locomotive components covered by their titles.

Electrical Section Officers

Chairman
C. R. Bland, C&O

Vice Chairman
H. P. Wright, B&O

Secretary
Carl C. Elber

Mechanical Division Committee Chairmen

ARBITRATION
W. N. Messimer, MDT

SUB-ARBITRATION
G. J. Flanagan, NYC

PRICES
L. B. George, C

BRAKES
T. H. Bickerstaff, AT&SF

COUPLERS
I. N. Moseley, N&W

LOADING RULE
H. L. Hewing, C

SAFETY APPLIANCES
W. O. Teufel, PRR

SPECIFICATIONS
L. S. Crane, Southern

TANK CARS
M. R. Buck, AT

GEARED HAND BRAKES
H. B. Wolfe, AT&SF

AXLES
W. M. Keller, AAR

PASSENGER CA
R. H. Graff, NY

Mechanical Division Staff

Vice-Chairman
L. T. Donovan
Asst. Exec.

Secretary
F. H. Stremmel

SUB-PRICE
. F. Davidson, StLSF

CAR CONSTRUCTION
J. A. Gower, PRR

OREST PRODUCTS
N. A. Williams, UP

LOCOMOTIVES
F. H. Einwaechter, B&O

WHEELS
P. V. Garin, SP

LUBRICATION
A. J. Schulte, AT&SF

ROLLER BEARINGS
F. Fahland, UP

LUBRICANTS AND FUELS
R. W. Seniff, B&O

Mechanical Research Moves Ahead

Despite the effects of the recession on railroad business and with the AAR Board of Directors cutting assessments for member roads by 20 per cent, the Mechanical Division research program for 1958 will operate on about the same budget as last year. "To do otherwise would be false economy—research is a job that is never completed," W. Faricy, AAR board chairman and chief executive officer, told a railroad group recently.

During the past year the importance which the AAR places on its research activities was emphasized by the appointment of W. M. Keller as vice-president—research, a newly created position. More recently, G. H. Newcomer, who was formerly assistant mechanical engineer of the Pennsylvania, has been appointed director of mechanical research.

Mechanical research will hinge around two priority projects—investigations of axles, and studies of fuels and lubrication. Work on axles will include fatigue tests of roller bearing axles, especially those for the all-purpose freight car roller bearings. Production specimens of the new raised-wheel-seat freight-car axle will be checked. Investigations of axles overheated in service and fatigue tests of locomotive axles will continue. Much of this work will be done on the two fatigue machines recently installed at the Research Center in Chicago.

Research Center machines used for certification of roller-bearing grease, the testing of journal lubricators and oils, and the testing of bearings are scheduled for several months in advance. Three cartridge-type bearings are now undergoing road tests in interchange service following laboratory tests on the full-scale bearing journal machine. Equipment is now available to test roller bearings as required by new AAR specifications. The Laboratory continues investigating the condition of journal-box packing after 18 months of service. The two roller-bearing grease machines are scheduled throughout this year. Several greases have passed tests on these machines and are in the process of certification.

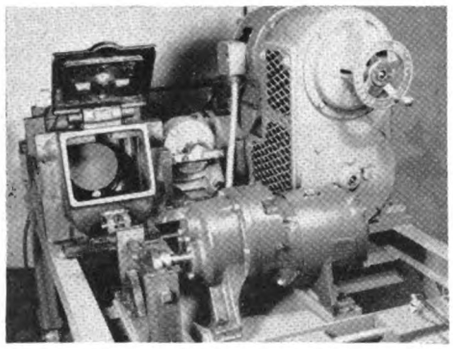
Analytical work is still going on in the chemical laboratory on grease characteristics. Electron microscope work shows that some of the present theories of grease penetration are inconsistent with bulk-penetration results and with the interpretations of conditions in full-scale roller bearings. Methods of evaluating the strength of grease fibers with various rates of shear are planned.

Road tests to determine methods for producing a better

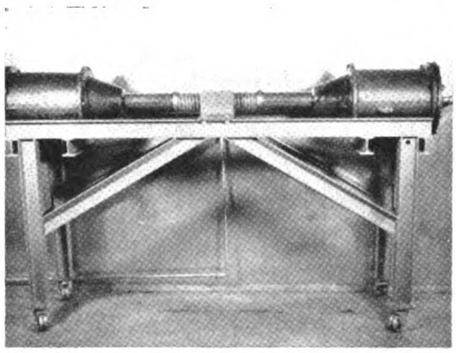
W. M. Keller

G. H. Newcomer

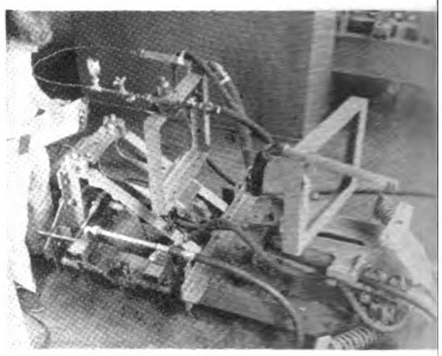
Projects Now Under Way at the AAR Mechanical Laboratory . . .



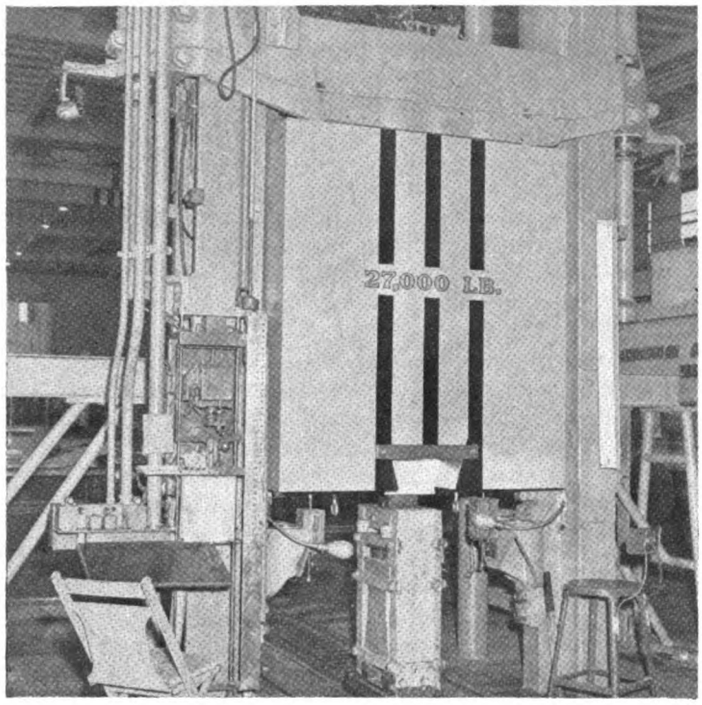
JOURNAL BOX SEALS
Oil retaining ability of rear seals submitted for approval will be tested on this recently-built unit.



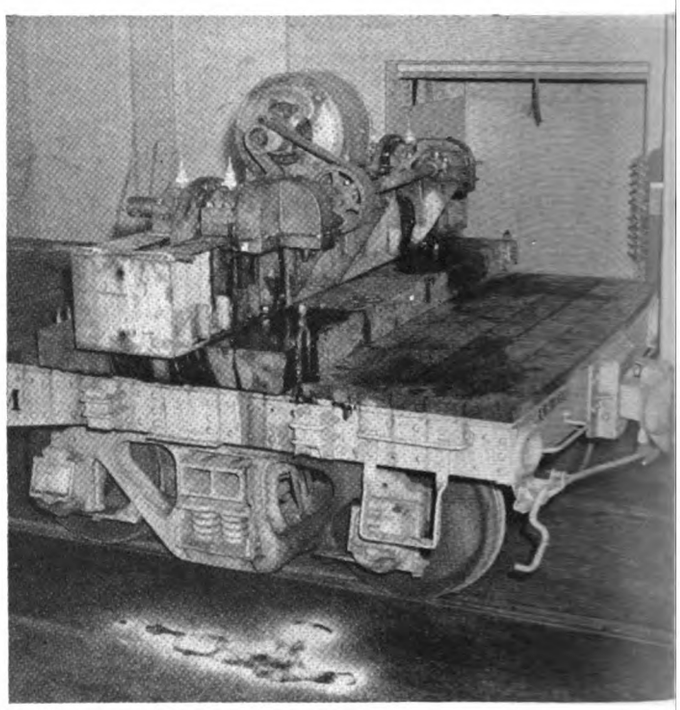
BRAKE CYLINDER LUBRICANT
Accelerated tests of the efficiency of greases for critical air brake application will be carried out.



AIR HOSE GASKETS
Motion of cars can be duplicated for gasket test Another set-up permits low temperature tests.



DRAFT GEARS
New tup for the test machine in the Research Center along with its new instrumentation will make possible more thorough analyses. AAR certifies new draft gears and conducts periodic checks after gears have been in service for varying lengths of time.



SNUBBERS AND TRUCK WEAR
Oscillator mounted on AAR flat car will be used for stationary tests of snubbers and truck component wear. Much cooperative work is done with member railroads on various projects and results of individual road experiments are frequently distributed.

load distribution over the oil film under solid journal bearings are now underway. Studies are being made to show the effects of reducing the crown radius of the journal bearing wedge from 78 in. to either 60 or 50 in. Investigation is also continuing to determine a condemning limit for journal wedges worn on top.

Solid Bearing Studies

Load-distribution tests are being made on solid bearings to determine what changes can be made in the contour of the bearing back to improve performance. Laboratory investigation continues on aluminum bearings lined with AAR babbitt to develop a bearing which can be road tested. Actual service tests will then explore the possibilities these bearings might have over the present AAR bronze bearing. Equipment and procedures have been set up for the development of better back seals for journal boxes. Oil loss from boxes has been an increasingly critical problem as the use of journal lubricators has increased.

A new machine is testing air-brake-cylinder grease at temperatures ranging from 130 deg F to minus 45 deg. This same temperature range is also used for tests of air-hose gaskets. Recently built and set up in the laboratory is a machine which simulates the movement of air hoses in train service.

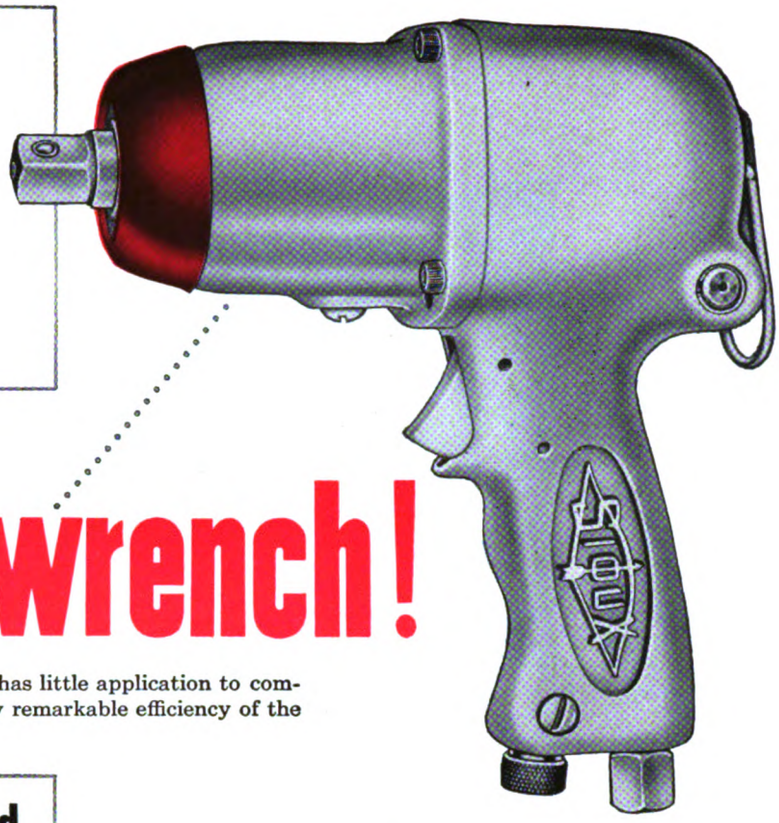
Tests of 13 different types of diesel fuel oil filters are nearly completed. Tests indicate the fuel filtering surface should be greatly increased. Unless this large area is provided, a filter will have either high efficiency or long life, but not both.

New equipment in the mechanical laboratory includes a 300,000-lb Olsen testing machine for tension and compression tests. An all-purpose milling machine, wheel-boring mill and lathe have been installed. Smaller machine tools are now available for the fabrication of test equipment.

15% more torque from the same air pressure while consuming 30% less air! *It's the new*

SIOUX

Air impact wrench!



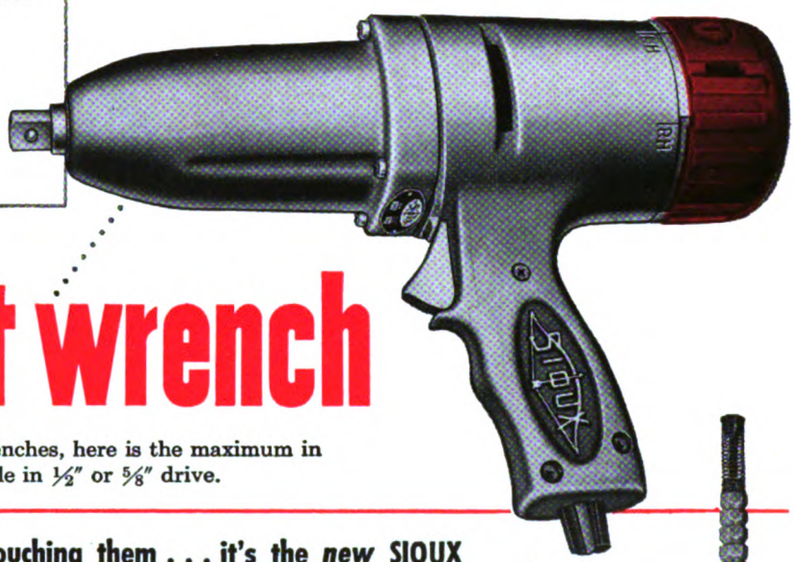
"Free as the air" is an expression which has little application to compressed air. Learn more about the truly remarkable efficiency of the new SIOUX Air Impact Wrench.

Unexcelled Performance and Durability....

It's the

SIOUX

Electric impact wrench



When it comes to electric impact wrenches, here is the maximum in dependable power per dollar. Available in ½" or ⅝" drive.

PELICAN

Spin nuts on or off without touching them . . . it's the *new* SIOUX

"Pelican" NUT ACCUMULATOR

Action of the impact wrench removes nuts and spins them up into the Pelican on a center stem. The stem will hold ten ¾" or 13/16" hex nuts, either 7/16" or ½" thread. Reverse action spins the nuts back on. Stems can be removed with their load of nuts and empty stems installed in their place. Or, stems can be pre-loaded and placed in Pelican for assembly operations.

The Pelican may be used with any ½" or ⅝" square drive, air or electric impact wrench.

PELICAN IN USE WITH NEW SIOUX AIR IMPACT WRENCH

LOADED CENTER STEM

LOOK UNDER "TOOLS—ELECTRIC"

WRITE FOR THE NEW CATALOG

SIOUX

ALBERTSON & CO., INC.

SIOUX CITY, IOWA, U.S.A.

NEW AIR IMPACT WRENCHES • NEW AIR SCREWDRIVERS • NEW "PELICAN" NUT ACCUMULATORS • ELECTRIC IMPACT WRENCHES • DRILLS • GRINDERS • SANDERS • POLISHERS • SCREWDRIVERS • PORTABLE SAWS • VALVE FACE GRINDING MACHINES • FLEXIBLE SHAFTS • ABRASIVE DISCS

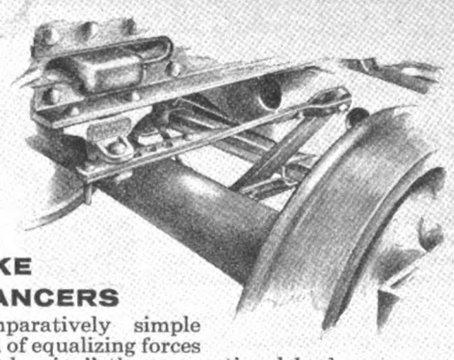
Since 1912

LEADERS IN RAILWAY APPLIANCE PROGRESS

Experienced in Design and Manufacturing of Specialized Products

The nation's railroads are noted for many great transportation achievements . . . one of the most important being the efficient handling of the country's heavy bulk freight.

Since 1912, The Wine Railway Appliance Company has designed and manufactured many of the important parts of hopper, gondola, flat and box cars that make this handling function possible, as well as profitable, for the owners and users of the cars. In the years ahead, Wine will continue, through its experience, engineering know-how, and manufacturing skills, to keep pace with the needs of the railway industry.

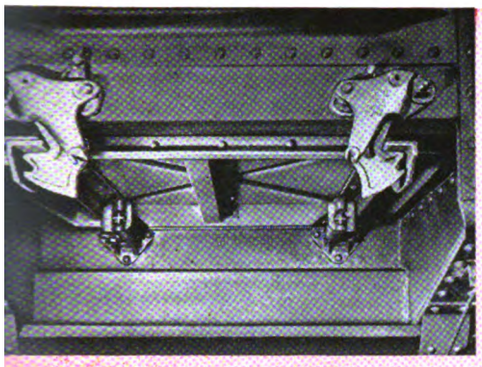


BRAKE BALANCERS

A comparatively simple method of equalizing forces and "balancing" the conventional brake arrangement by replacing the dead lever connection to the truck bolster with the Wine Balancer—connected to the car underframe. A bracket and connector at each end of the center sill flange, engaging the dead lever, balances the brake forces by returning them to the underframe of the car.

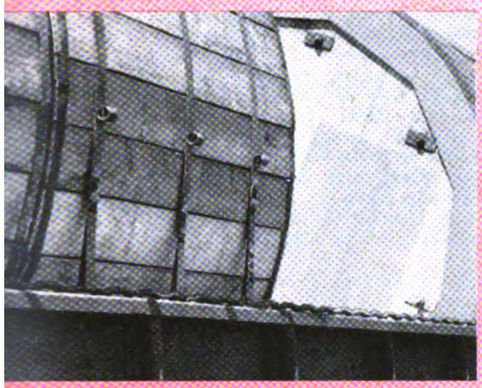
CORRELATED HOPPER UNITS

The one-piece, cast steel frame unitizes each individual hopper into a structurally sound, functional assembly which assures positive door fit. The adjustable locks, cast steel hinges, and symmetrical tapered door flange make possible the *only* adjustable door fit permitting compensation for wear and common irregularities of construction. "Balanced" unloading is assured by dual door operation and a method of controlled flow.



)P BOTTOM SPRING HINGES
) ADJUSTABLE LOCKS

Bottom Gondolas equipped with these two products provide the shipper and receiver e lading with a positive closure and afford a economical one-man operation, with selec- ingle or multiple opening of doors.

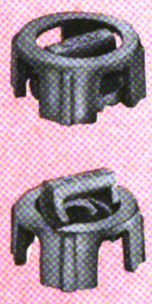


NTINUOUS LADING BAND CHOR

e's continuous offset bar for top-coping ications provides a secure anchor for lading ds every 7½ " of its entire length. Permits the of all types of banding material.

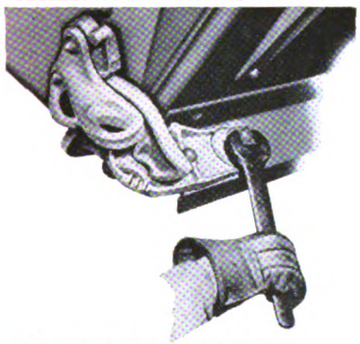
DROP END LOCKS AND END BALANCERS

The *complete* drop end combination from operating and security standpoints! Interlocked corners provide rigidity to keep the sides from spreading under load. The balancer incorporates the hinge function . . . permits a one-man, time and labor saving closure.



UNIVERSAL LADING BAND ANCHORS

Easily applied on all flat cars and gondolas, the Wine Universal Type Anchor features 360° rotation for tie-ins from any direction. Versatility of use permits welding on coping at important locations as well as mounting in the floor. Drop flush when not in use.



)JUSTABLE HOPPER)OR LOCKS

e adjustment feature allows compensation for ıstruction differences and readily permits ad- tments necessitated by wear. Wine Adjustable pper Locks are adaptable to built-up, struc- al hopper openings as well as cast steel frames.

WINE

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Arc Air, Inc. 18-19
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Motor Coils Mfg. Co. 58-59
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National Electric Coil Co. 92-93
Nife, Inc. 84-85
Pyle National Co. 48-49-50
Railway Age 104
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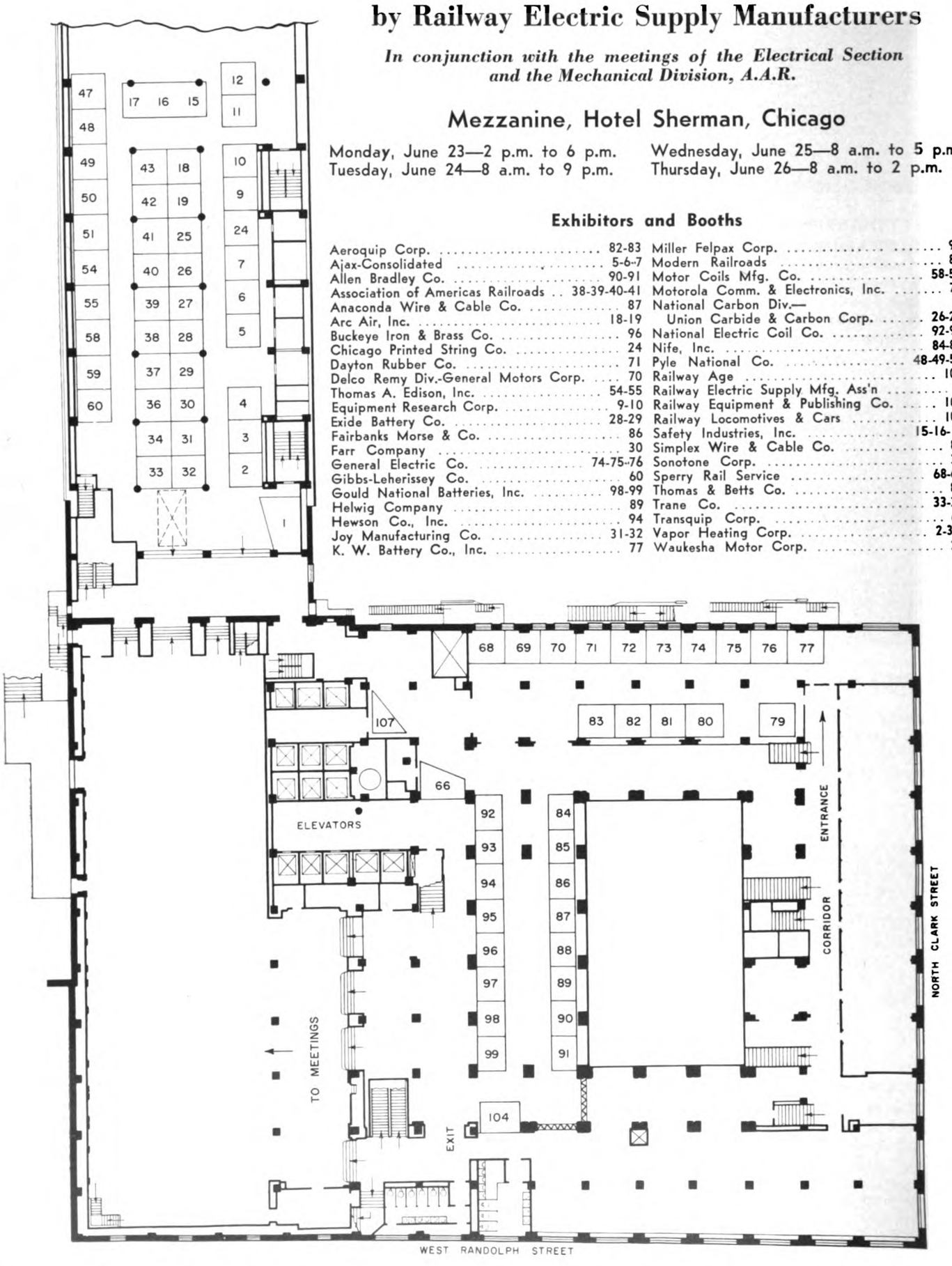

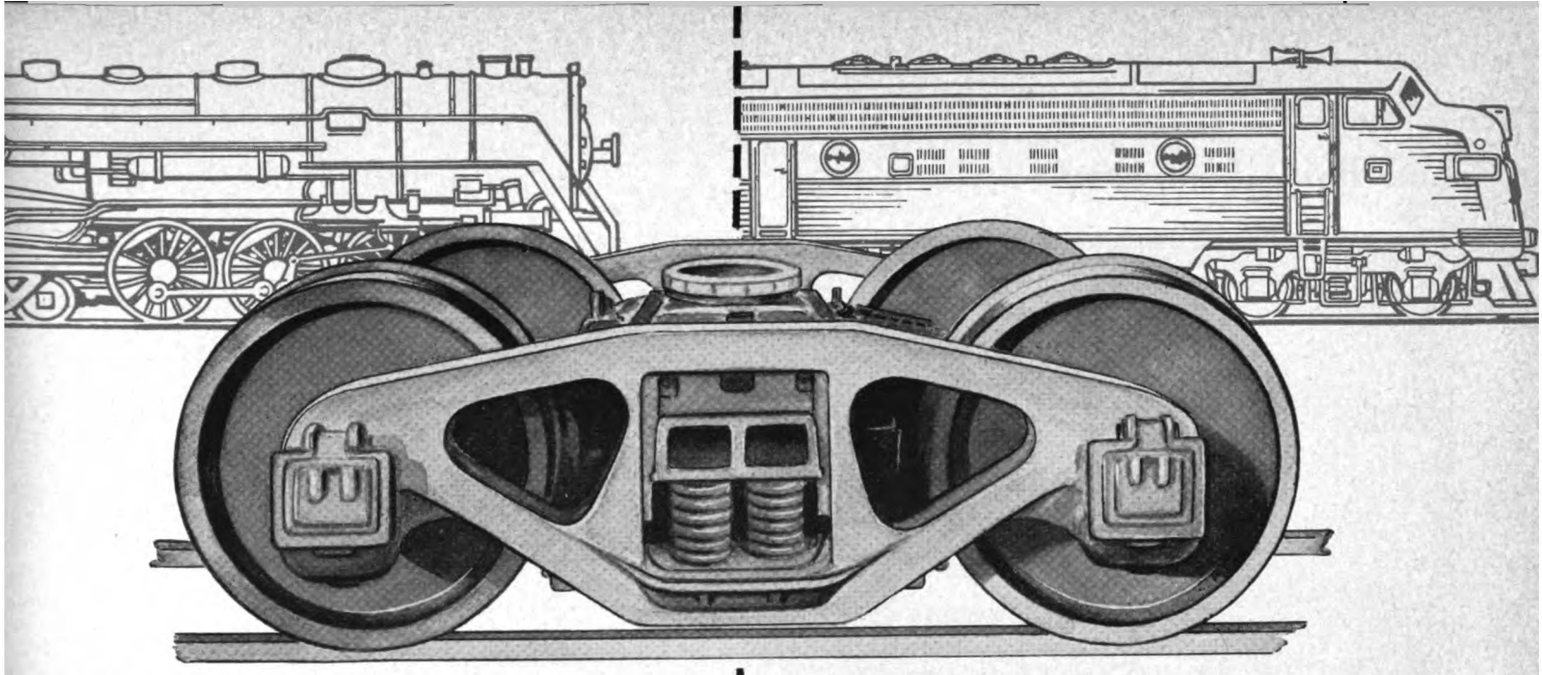

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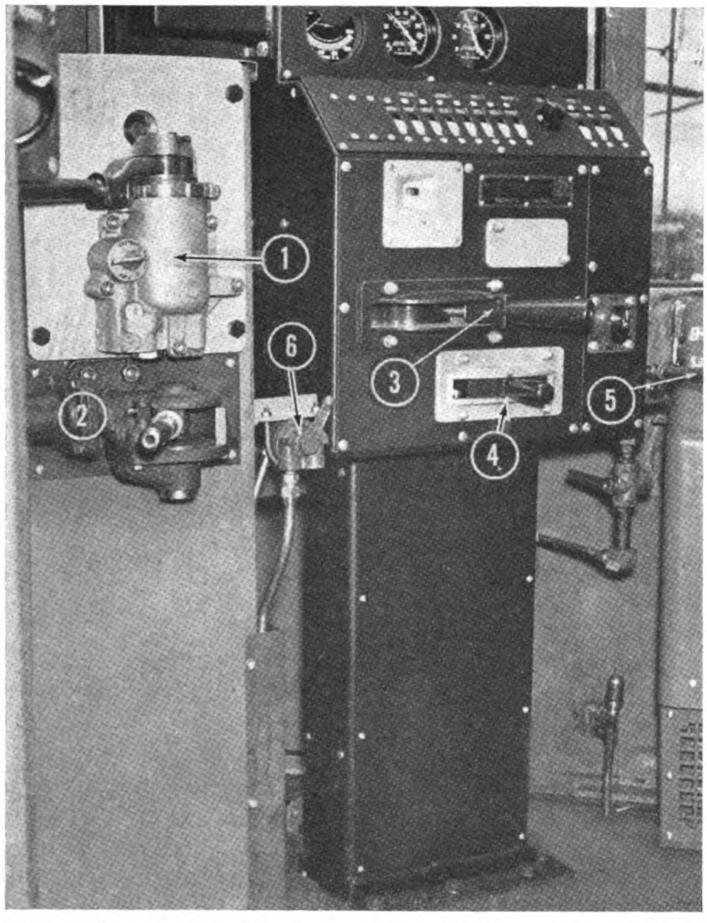
New Brake Equipment . . . . . *. . . . . for Milwaukee GP-9's*



Cab controls include (1) automatic brake valve, (2) independent brake valve, (3) throttle, (4) reverser, (5) horn valve, and (6) bell operating valve.

Along with 26-L brake, Milwaukee "geeps" have full electrical control instead of conventional electro-pneumatic arrangement.

. . . . . and for Export G-16's

Export G-16 with "26" equipment was tested in Chicago area before going abroad as a demonstrator.

EMD Applies 26-L Locomotive Brake

Westinghouse Air Brake designed equipment to simplify maintenance and have all latest braking refinements

THE FIRST APPLICATION of the new Westinghouse Air Brake 26-L brake equipment has been made by Electro-Motive to 10 GP-9 road switchers recently delivered to the Milwaukee Road. Erie Mining Company's tests on the AC valve for freight cars *(RL&C, August 1957, page 52)* and experience with lightweight train equipment *(RL&C, October 1956, page 66)* paved the way for the 26-L locomotive brake.

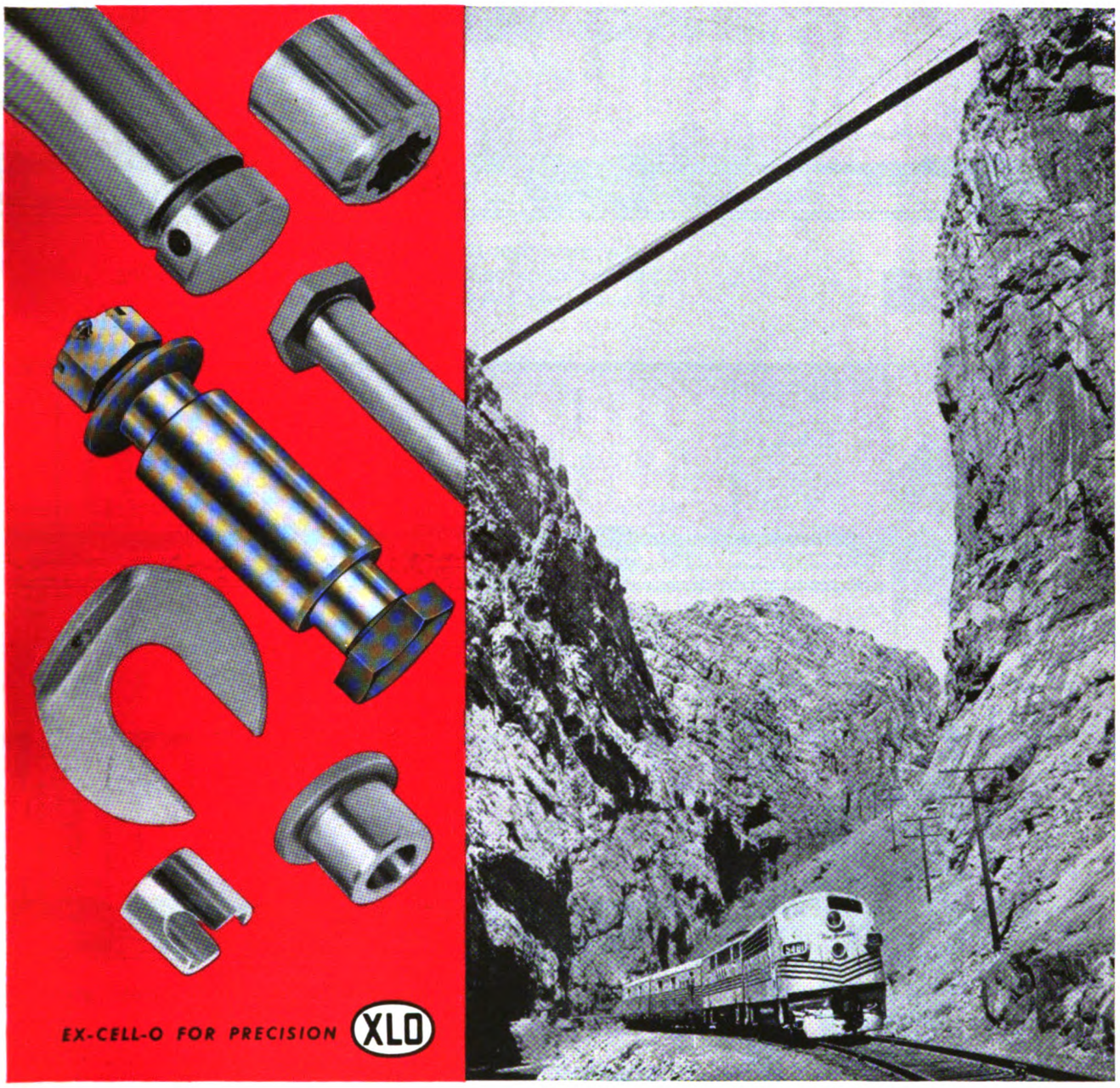
The equipment features a brake valve which eliminates the feed valve and equalizing portion. Train line leakage is maintained in all positions of the brake valve except emergency. Rubber-faced valves, rubber diaphragms, and "O" ring-packed spool valves are used. These lightweight and small size valves take the place of rotary valves, slide valves, and piston and ring assemblies. This construction simplifies repair and maintenance procedures. Braking power can be varied by using different diaphragm ratio relays.

Basic Equipment

• The 26C brake valve is a self-lapping automatic type, having two main portions. The automatic portion regulates brake pipe pressure controlling both locomotive and train brakes. The independent portion applies and releases the locomotive brakes independent of the train brakes; and it controls release of a locomotive automatic brake application independent of the train brakes.

• The independent brake valve controls locomotive brake cylinder pressure. Movement of the handle increases the pressure in proportion to handle movement. Depression of the handle in release position causes release of any auto-

(*continued on page 46*)



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57-29

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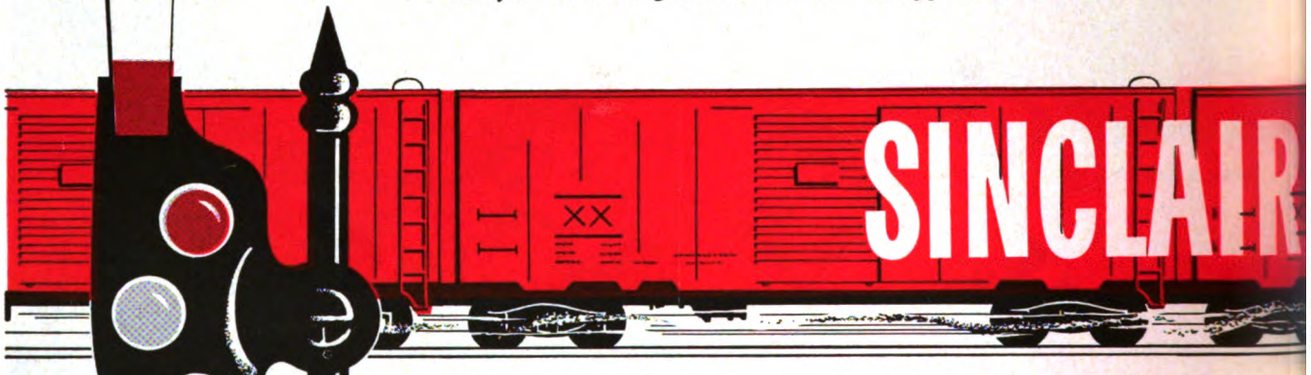
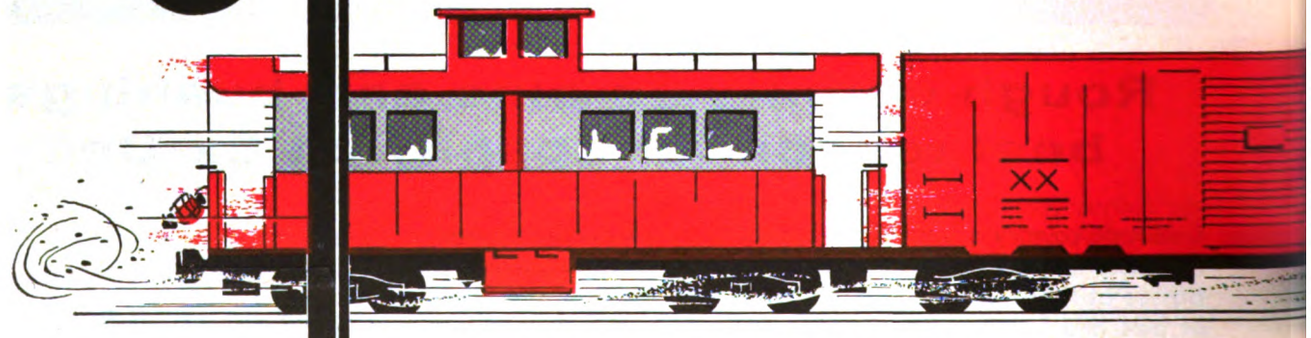


Unsurpassed for heavy-duty work in Diesel traction motor gears.



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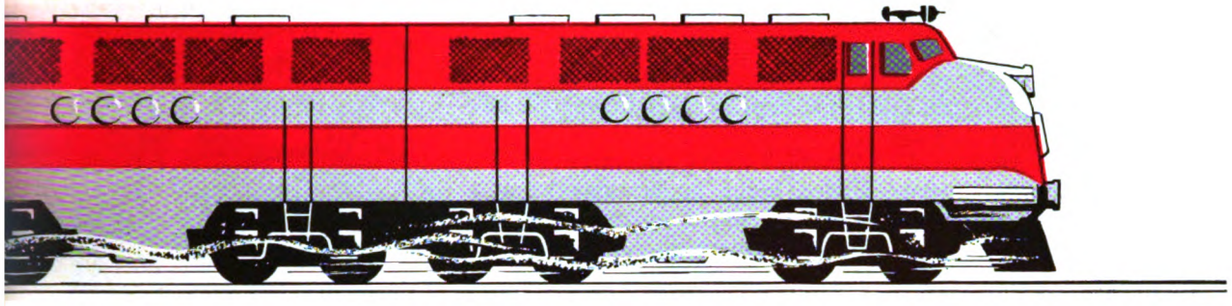

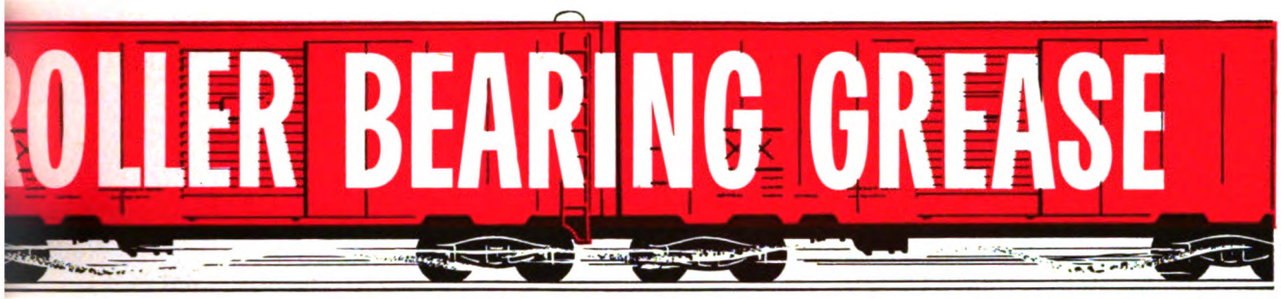

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EMD Applies 26-L Brakes . . .

(*Continued from page 42*)

matic brake application on the locomotive.

• The 26D control valve responds to changes in brake pipe pressure, developing brake cylinder pressure from brake pipe reductions with reference to the control reservoir pressure. This control valve consists of two portions—service and quick release.

• The J-1 relay valve is diaphragm-operated and self-lapping. It supplies and exhausts brake cylinder air pressure during brake applications.

Additional modifications to the basic equipment can be made to provide:

1. Multiple-unit control of independent brake funcitions with break-in-two protection. An MU Valve and Selector Valve permit multiple-unit operation with 6SL, 6-BL, or 24-RL equipment. This arrangement is universal and provides positive brake control under any operating condition.

2. Safety-control function for overspeed, foot pedal, and train stop is controlled from the equalizing reservoir, and permits uniform service reductions independent of train length. Equipment required for this application consists of an extremely small P-1 application valve and the usual foot pedal and overspeed details.

3. A dynamic-brake interlock prevents service brake applications from applying on locomotive while using dynamic braking. Emergency applications will nullify the dynamic brake interlock. The independent brake can be applied at any time. Only a three-way magnet valve and pressure switch are required to provide this interlock and over-riding function. The automatic brake will not reapply after the dynamic brake is released.

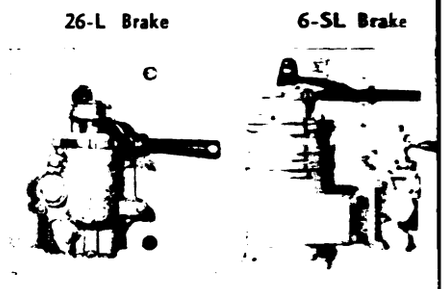
4. A break-in-two interlock can be provided to reduce engine speed to *idle* position and apply brakes in event of rear-end application or train break-in-two.

5. A 60-second sanding period can be provided in emergency. This will prevent emptying the sand boxes and conserve main reservoir air.

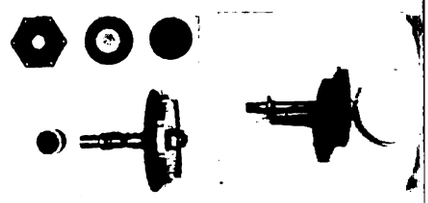
Comparison of Features

26-L Locomotve Equipment	24-RL Equipment	6 Equipment—6-BL and 6-SL
Graduated release	Graduated or direct release	Direct release
Pressure maintaining	Pressure maintaining available when required	Pressure maintaining not available
Emergency valve in brake valve	Emergency valve in brake valve	Separate emergency valve required
Safety control and train stop cut-off function included in brake valve.	Safety control and train stop cut-off function included in brake valve.	Cut-off function provided with separate application valve.
Diaphragm valves	Pistons and rings with bushings	Pistons and rings with bushings
Spool valves	Slide valves	Slide valves
Renewable parts	Repaired by hand lapping	Repaired by hand lapping
Universal multiple-unit	Trains only with similar type	Trains only with similar type
Not sensitive to oil and dirt	Surfaces subject to friction variation with dirt	Surfaces subject to friction variation with dirt

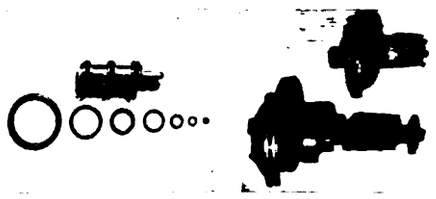
Some of the Changes . .



26-L brake valve 6-SL brake valve



Rubber diaphragms replace pistons, rings, bush



Rubber "O" rings replace slide valves and sc

Disc and poppet valves replace rotary valves

New components in left column perform sa functions as parts shown at the right.

PFE Mechanical Reefers

(*continued from page 28*)

new cars is accomplished through a modification of air-circulating equipment. PFE deep-freeze mechanical reefers previously built were of the "envelope" design which surrounds lading space with a blanket of cold air. The new cars are designed so that a portion of the cold air from the evaporator is directed in controlled amounts—approximately 20 per cent—through diffusers in the aluminum ceiling directly into the lading compartment and returned through an air channel under the floor racks.

Refrigeration equipment selected for the 50-ft cars, designed principally for frozen food service, is Carrier Corporation's Model 66-E-9 single compressor unit, driven by a GM Detroit diesel engine, Model 2-71, rated at 34 hp with a 15-kw generator.

Of the second 500 cars, 300 will be equipped with Trane refrigeration equipment, 175 with Carrier equipment, and 25 with Union Asbestos & Rubber (Equipment Specialties Division) secondary refrigeration systems. All will be powered with Witte Engine Works 18-hp diesel engines and 12.5-kw generators. Fuel tank capacity is 500 gal. on both 50-ft and 40-ft cars.

Temperature Control

All cars are equipped with magnetic-amplifier thermostatic controls. Compressors have electrically-controlled solenoid unloaders for ease of starting. Compressors also are unloaded when the lading-compartment temperatures rea a predetermined differential from t thermostat setting. This feature restri refrigeration capacity, but results in o taining desirable humidity control. d to lower temperature differentials in th air running in and out of the evaporato

For fresh fruits and vegetables, co stant temperatures can be maintained i any range as required between 32 an 70 deg F and for frozen foods te peratures can be maintained down —10 deg F.

An indicating light, located under th running board on the "A" end of th car, is visible either from the ground from the car roof. When lit, it serve as a "telltale" showing inspectors th equipment is operating satisfactori and temperatures are within desire limits.

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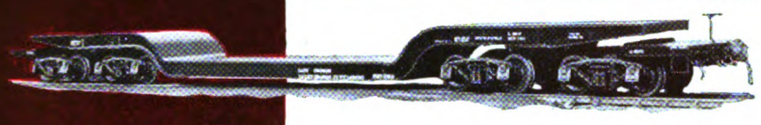
—BUCKEYE built..

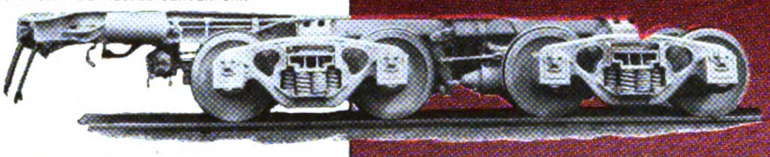
HEAVY DUTY TRUCKS

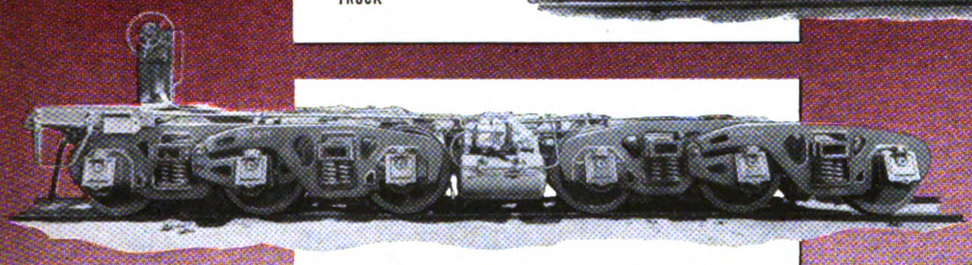
for 100 to 300 ton capacity freight cars



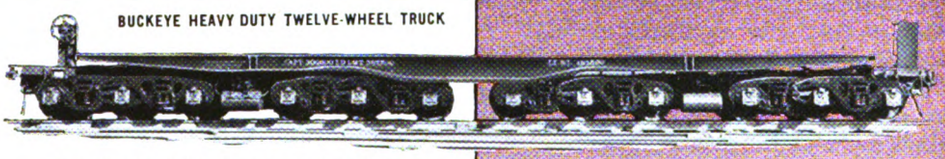
BUCKEYE EIGHT-WHEEL TRUCK INSTALLATION ON 175-TON CAPACITY DEPRESSED-CENTER CAR

BUCKEYE HEAVY DUTY EIGHT-WHEEL TRUCK

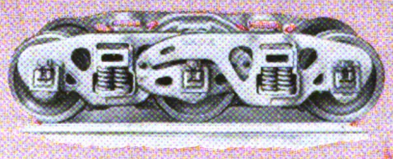




BUCKEYE HEAVY DUTY TWELVE-WHEEL TRUCK



BUCKEYE TWELVE-WHEEL TRUCK APPLICATION ON 250-TON CAPACITY SPECIAL CAR



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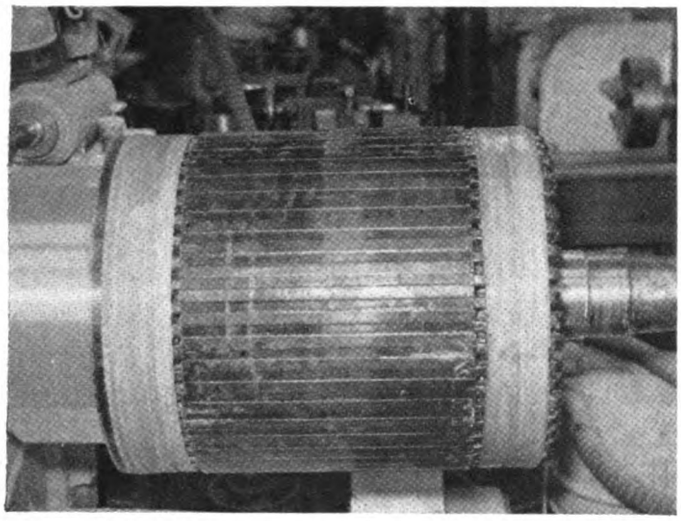
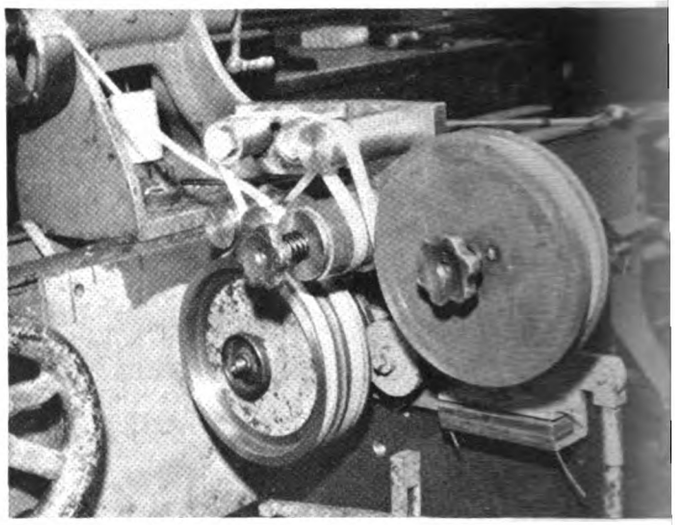


Railway motor armature with Fiberglas bands is ready for installation. In case of band failure here, it is claimed that damage would be confined to rotor. With steel bands the stator could also be damaged.



Tensioning device used by Westinghouse shops is threaded with FRP tape and ready for use. FRP tape made by Chicago Printed String Co. is known as Resi-I-Glas and can be used for this type of banding operation.

Banding Armatures With FRP Tape

Fiberglas reinforced plastic material has mechanical and electrical qualities for railway service

THE DEVELOPMENT of Fiberglas-reinforced plastics during the past 10 years has made available materials which can be used to band the armatures of motors and generators. These materials not only have the strength and mechanical advantages of steel bands, including that of application under required tension, but they are also insulators and nonmagnetic.

D-c armatures and a-c wound rotors have their conductors wound on the outer surface of the rotor. The active sections of the coils are arranged in slots, but the end connections lie on the outer surfaces of the coil supports.

These conductors have to be held in place against centrifugal forces created by the rotation of the machine. Such centrifugal forces may be 1,000 to 5,000 times the weight of the windings depending upon the speed and diameter of the rotor. To keep efficiency high, the air gap has to be relatively small.

Alloy steel wire, cold drawn to the highest available strength, has been used to form the bands for restraining these conductors. It is wrapped around them in a number of convolutions and in sufficient layers to hold the conductors against centrifugal forces.

Band strength is not the only requirement. The conductors are held in place against the effects of electromagnetic vibration by the proper filling and tightening in the slots. In addition, they are held against centrifugal force by slot wedges or core bands. On the end windings, end connections have to be properly wedged against each other and drawn into a continuous arch which has the proper pressure between all conductors and between the conductors and the coil support to prevent electromagnetic vibration between coils.

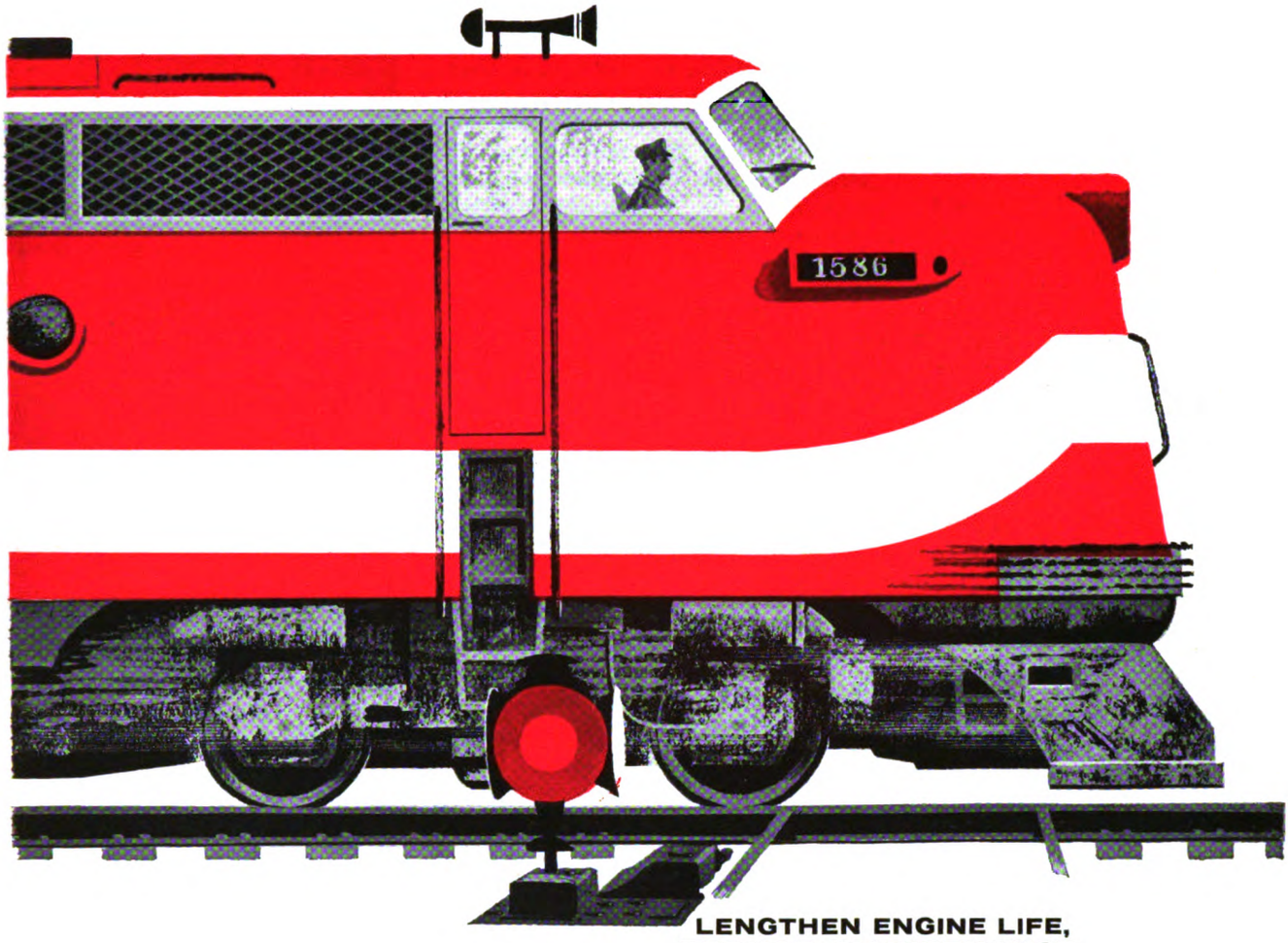
It is necessary that the band has residual tension at least equal to the maximum created by centrifugal force so that breathing of the conductors with speed changes is kept to a minimum. At standstill, the band tension will be resisted by the arching pressure between conductors and the pressure against the coil supports. These requirements are met by winding the wire on the coils with a tension equal to or greater than that obtained by centrifugal force at maximum operating and test speeds. In the past, wide steel straps have also been used as bands. In general they have not been satisfactory because of a lack of residual tension.

Steel wire banding has usually been secured by clips and solder. Failures of this type of fastening in extreme applications led to an important development —the solderless band. Actually, this is a means of locking the ends of the wire band to each other so that the strength of the band is entirely independent of any solder which may be used to prevent the band from moving or separating.

All metallic bands must be insulated from the conductors. This is usually done with insulating pads between the bands and the windings. These pads, however, do not completely insulate against creepage currents in severe applications such

(*continued on page 50*)

This article was written by Wm. Schneider, engineering manager, Apparatus Repair, Manufacturing and Repair Division, and W. H. Eunson, engineering consultant, Westinghouse Electric Corporation, Pittsburgh, Pa.



LENGTHEN ENGINE LIFE,
REDUCE MAINTENANCE

Esso Airfil Coating Oil adds outstanding dirt pick-up properties to diesel air intake filters. Airfil protection is so effective that it pays off handsomely in reduced abrasive wear, lowered repair costs, longer engine life. ¶ Airfil also shows superior wicking qualities. Successive layers of dirt and dust are quickly wetted, exposing a fresh, efficient dirt-retaining surface at all times. ¶ Applying Airfil is simple. It goes on rapidly as a hot liquid and cools to a gel-like solid that retains its consistency at engine-room temperatures. And since Airfil is insoluble in water, it stays on the filters, even in the wettest weather. It can, however, be readily removed by a hot detergent wash or a steam blast.

Airfil's cost-cutting advantages make it ideal for passenger car air-conditioner filters too. For further information or technical assistance, call your local Esso office, or contact: Esso Standard Oil Co., Railroad Sales Division, 15 W. 51st St., New York 19, N.Y.

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Esso
RAILROAD PRODUCTS

Banding Armatures . . . .

as armatures in locomotive motors and generators. In high voltage armatures, the steel bands have to be completely covered with insulation.

FRP Tape Banding

The Fiberglas used for armature banding is in the form of a tape with the glass fibers laid up in the longitudinal direction only, without cross-weave, held together with polyester resin in a semicured state. Some of the properties of Fiberglas are a tensile strength of 400,000 psi; a modulus of elasticity of 10,500,000 psi; no creepage and no hysteresis. When filled with resin and cured, fiberglas exhibits excellent electrical properties—its dielectric strength varying between 80 and 600 volts per mil and a minimum arc resistance of 180 sec.

The Fiberglas reinforced plastic tape is made up in various widths all .013 in. thick in the semicured stage. Maximum permissible tensions before curing for the various widths of tape available are: ⅜ in.—350 lb; ½ in.—465 lb; ¾ in. —700 lb; 1 in.—930 lb; 1¼ in.—1,170 lb and 1½ in.—1,400 lb.

In the application of Fiberglas bands to armatures, it is necessary first to pull the armature coils down into their final position by any approved method now in use. These include temporary banding, reroll banding, or in clamping in "squeeze box" followed by driving of armature wedges or sticks in place.

The armature is then heated to approximately 125 deg C and placed in a banding lathe. This initial heating has been found by test to be an important step in the process. Test bands placed on a cold armature relax during the final cure.

The band locations are then determined; and if the banding tension requirement is in excess of 200 lb, restraints are placed around the armature to prevent successive layers of the glass tape from squeezing the underlaying layers out of position. This is especially important where the band at the pinion end rides almost over the curvature of the coil knuckles.

These restraints are also generally made to the height of the finished band so its thickness can be properly gaged. Various methods of placing these restraints have been devised. It is also customary, but not necessary, to cover the edges of the band with a serving made of woven glass tape heavily filled with polyester. This covers the somewhat rough and sharp edges left by the layers of the tension taping. Where the tension band is to cover large gaps between the armature coils, it is necessary to cover these gaps with strips of .015-in. laminate.

The bands should be wound on with sufficient tension to stretch them somewhat more than would be done by the centrifugal force. This pulls the coils down into their final position and arch binds the end turns preventing coil movements due to changes in speed. Generally such tension is determined from the original steel band design which specifies wire size, number of turns, as well as tension. For steel wire bands in Westinghouse railway motors, the following tension table has been developed:

Wire Diameter, (In.)	Single Band (Lb)	Double Band, Upper Layer (Lb)
.029	90	60
.045	225	150
.057	350	250
.064	400	300
.072	500	400
.081	600	500

Because of the multiple layers in Fiberglas banding, the tension used is that corresponds to the upper layer of steel wire bands.

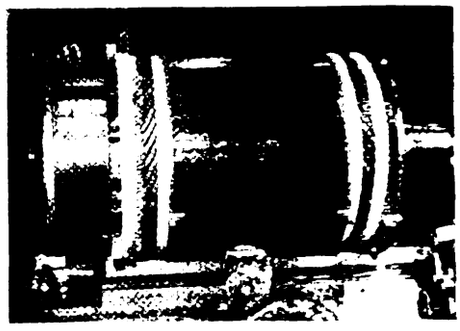
A tension device, suitable for winding the Fiberglas tape on an armature, is used by all Westinghouse apparatus repair shops. It is capable of applying the Fiberglas bands at tensions up to 600 lb. This device can also apply the wire temporary bands.

Because of the difference in ultimate strength, the FRP band cross-section is approximately twice the cross-section of the steel wire band. This is determined from the ultimate strength of the composite Fiberglas and polyester resin which is 120,000 psi at room temperature and between 85,000 psi and 100,000 psi at the maximum operating temperature of the band, as compared to 220,000 psi for stainless steel with a proportional limit of 175,000 psi.

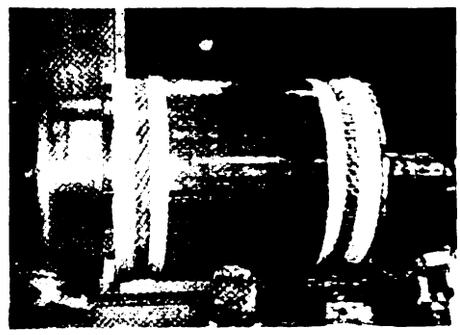
When each tension band is completed, the end of the tape is secured by applying a hot iron to the section just ahead of the point where the tape is cut. Heat accelerates the polymerization of the end of the tape just enough to cause it to adhere to the body of the band. The tape can then be cut without danger of unwinding.

When a smooth, glossy band surface is desired, it is covered with one or two layers of woven tape impregnated with polyester. This is the same tape used for serving the edges. After the bands are applied, they should be covered with a brushed-on coat of varnish to prevent air inhibition. They are then baked at 125 deg C, (255 deg F) for four to six hours to fully cure the polyester resin.

The Preliminary Steps . . .



Lateral restraints installed on armature can also serve as gauges to measure the band thickness



Laminated strips cover large gaps in windings and are added after lateral restraints are in place.

Armature has edge-serving tape wound on to cover the sharp edges that result from tension taping.

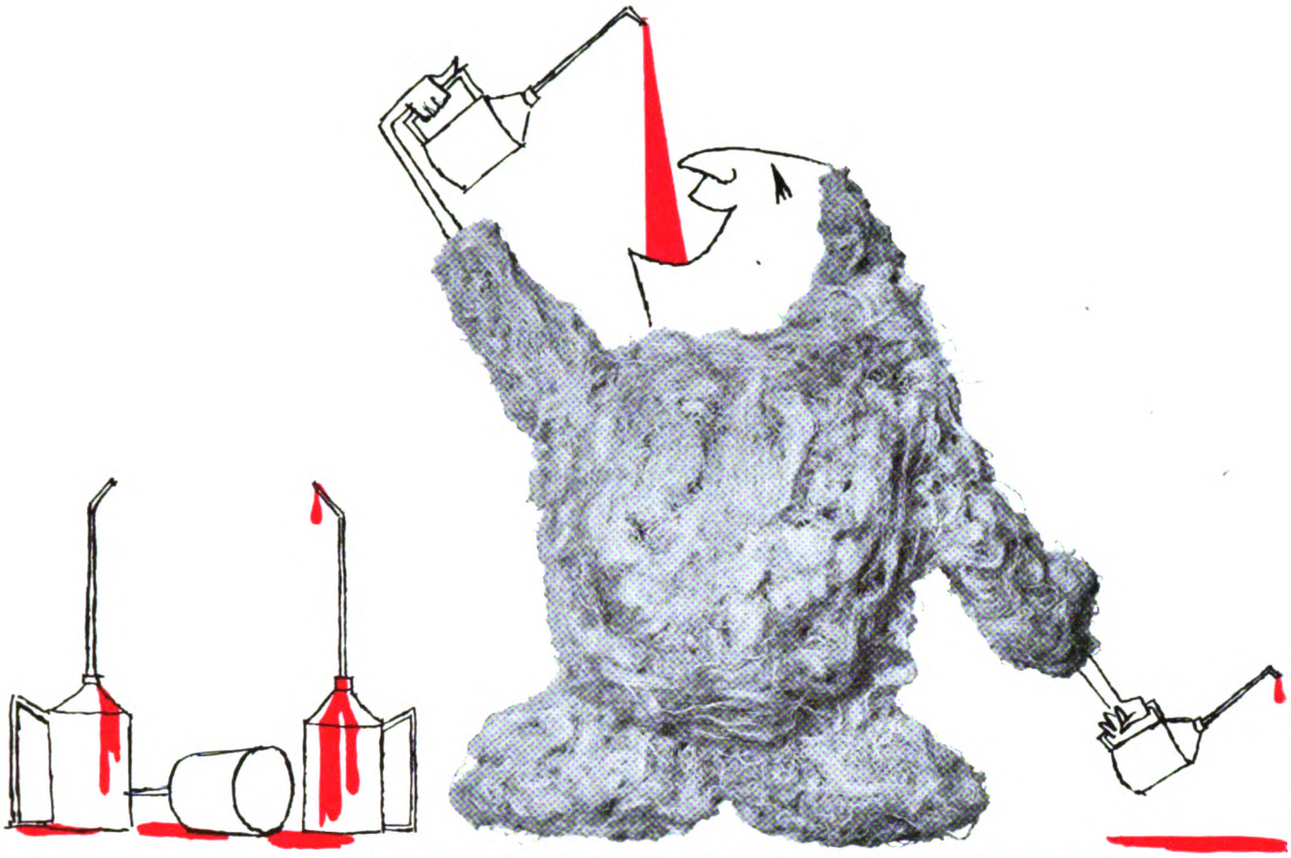
After final dipping and baking the armature is ready for balancing.

Armature Balancing

A dynamic balancing machine is used to locate necessary balancing weights. Two general methods of securing these weights to the bands are used. In one, an epoxy-filled compound, with about 60 per cent of its weight in lead, is mixed with a catalyst, and immediately placed on the band. It air cures in one or two hours. With infrared lamps or Calrod units, curing time can be reduced to as low as 15 min.

In the second method, small pieces of copper-plated lead, 1/16-in. thick, are cut to suitable size and weight and are cemented to the band with high-strength adhesives. One such adhesive cures at room temperature in one to two hours, although it does not obtain its maximum

(*Continued on page 52*)



Here's proof that WIPING WASTE absorbs over four times as much oil as cloths!

. . . certified test report available on request

In precise, scientific tests conducted by a prominent Chicago engineering firm, cotton wiping waste and wiping cloths were compared to determine their absorptive qualities. Samples were tested under identical, controlled conditions. The carefully tabulated figures prove once and for all that wiping waste absorbs 443% as much oil as the same amount of wiping cloth! The complete report of these tests has been prepared and is available free upon request. Use the convenient coupon below.

Actually these new tests only bear out old facts already known to most users of wiping waste. Wiping waste, consisting of all new, uniform threads, is by its very nature more consistently efficient. What's more, since good quality wiping waste can be purchased at a much lower initial cost per pound than proper quality wiping cloths, waste is considerably cheaper to use.

All in all, it adds up to one thing: You'll get more efficient performance, at lower cost, by switching to cotton wiping waste.

INSTITUTE OF THREAD MACHINERS INC. — JOURNAL BOX PACKING — MEMBER

INSTITUTE OF THREAD MACHINERS, INC.

84 Field Point Road
Greenwich, Connecticut

Institute of Thread Machiners, Inc.
84 Field Point Road
Greenwich, Connecticut
Dept. RL-2

Gentlemen:

Please send me a copy of your engineering test report on cotton wiping waste.

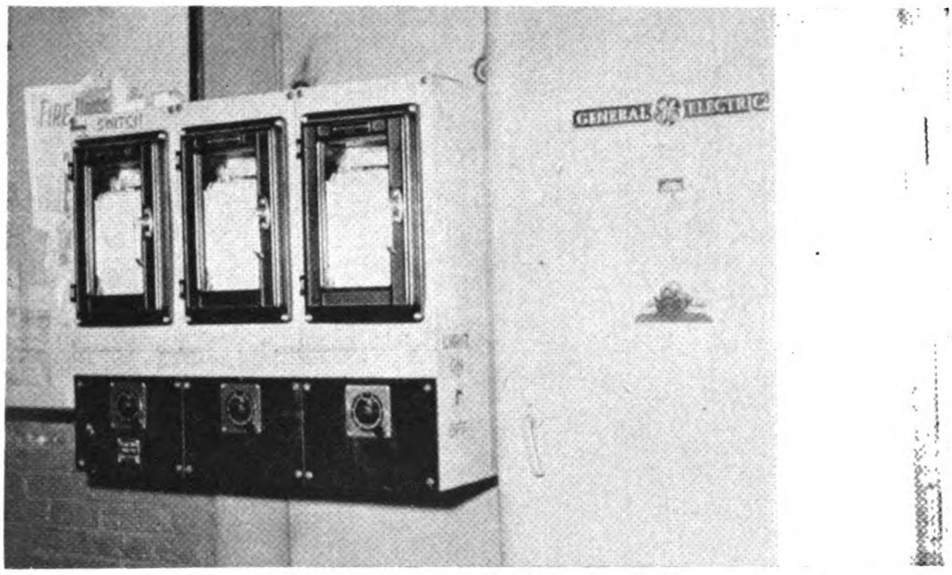
Name_____

Organization_____

Address_____

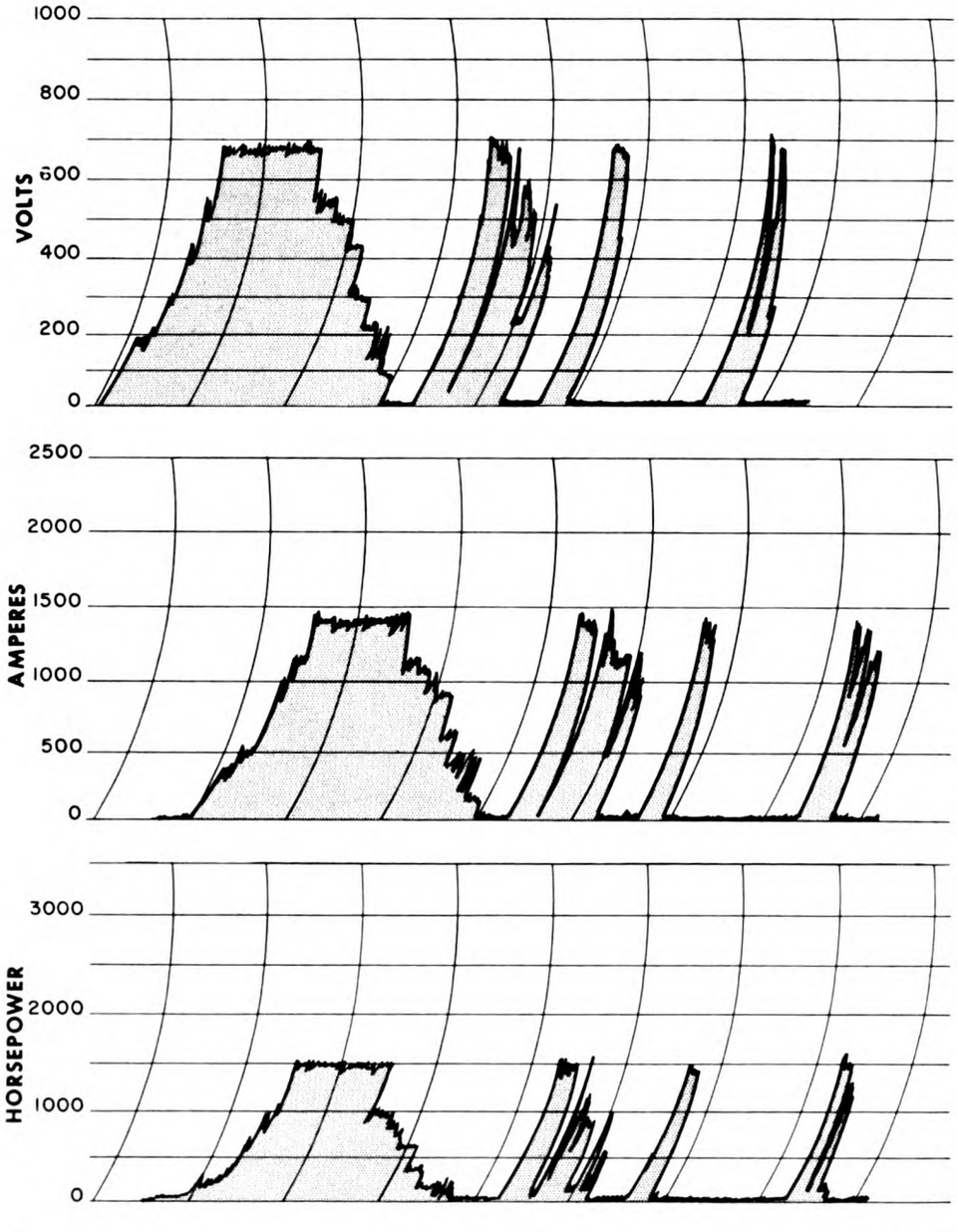
City_____ Zone____ State_____

Putting Locomotive Performance on Record



The three curve-drawing meters record volts, amperes and horsepower while the locomotive power plant is loaded on the resister at the right.

Below: Typical meter charts obtained while an engine and generator are given a load test.



Knowledge of engine and governor performance is acquired and recorded when load tests are performed on diesel locomotive power plants at Silvis, Ill. on the Rock Island. The engines and generators are loaded on General Electric load resistors. While the load tests are being made, three Esterline curve-drawing meters show power plant performance by recording volts, amperes, and horsepower. The third meter is, of course, a wattmeter, but the scale is corrected to show horsepower instead of kilowatts. Values of horsepower are better understood and no conversion is necessary.

The three charts are filed and serve as a check when subsequent tests or repairs are made on the locomotive. The charts also show the behavior of engine and governor in a manner which can not be determined by means of indicating instruments.

Banding Armatures . . .

(*continued from page 50*)

strength for 24 hr. In each of these methods, the varnish should be sanded off the part of the band to which the weight is to be applied. Sheet lead must be copper-plated because the plain lead inhibits the adhesive even when thoroughly cleaned.

Another method of balancing is to do the job before the Fiberglas bands are applied. Necessary weights are cut from sheet lead, and located on the armature. Such weights are placed on flexible mica pads about ½-in. wider and longer than the sheet lead and wrapped into the Fiberglas band after two or three layers are wound on the armature.

Placing balance weights on railway armature bands should be avoided as far as possible. Most modern armatures and commutator spiders are provided with grooves for attaching weights. Balancing the core before winding will keep the amount of weights to be added to the bands to a minimum. After balancing, the armature generally receives a final coat of air-drying varnish.

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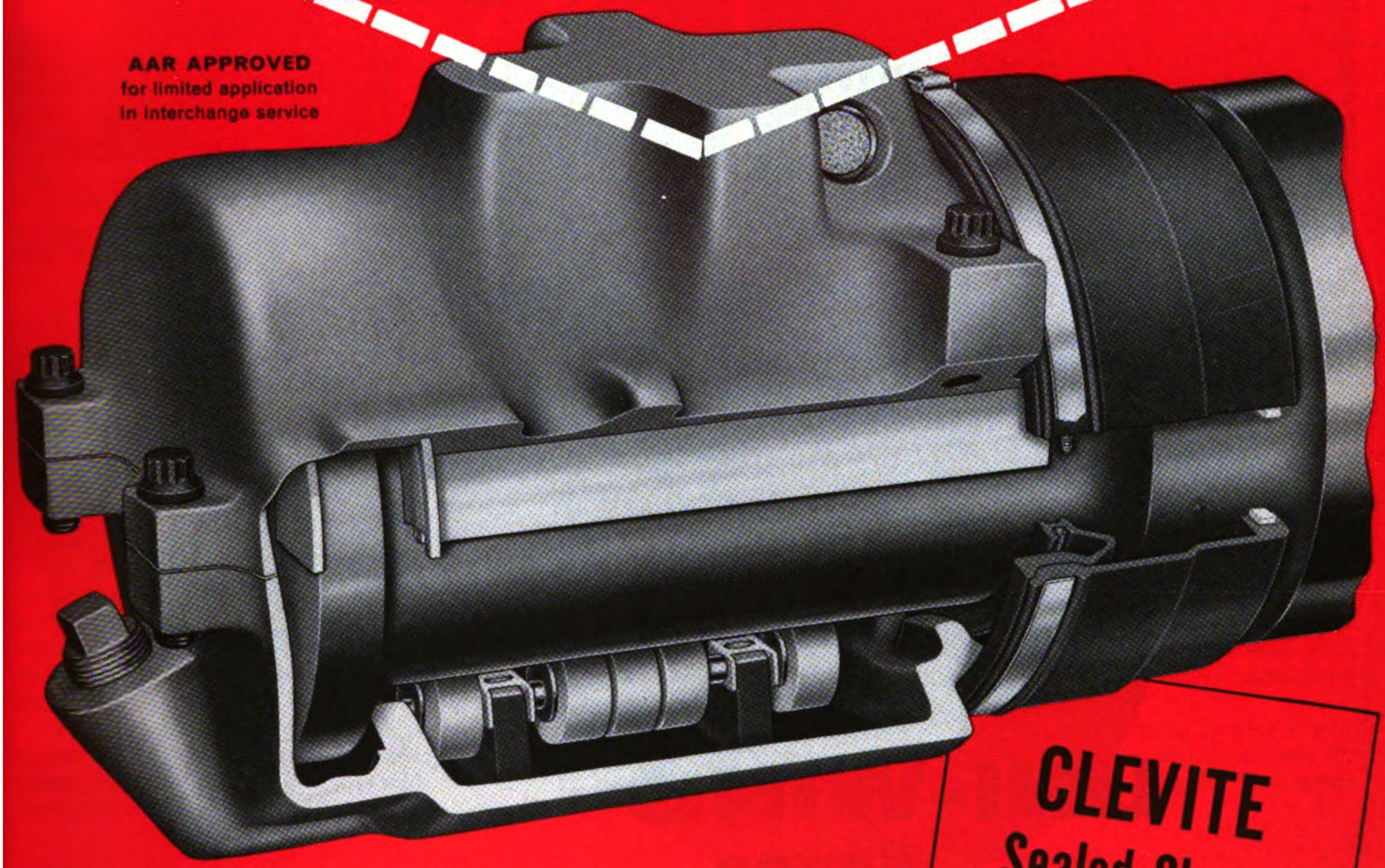
AAR APPROVED
for limited application
in interchange service



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...new, permanent, soundly engineered and economical journal bearing conversion for freight cars.

WHAT TESTS SHOW In continuing road and laboratory tests, under the hardest service and simulated operating conditions, the performance of Clevite Cartridges has far exceeded all expectations.

Also experience from the growing number of applications shows that Clevite Cartridges require less modification of equipment, are installed at lower cost than any other comparable conversion. ***WATCH FOR MORE TEST RESULTS!***

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The CLEVITE Bearing Cartridge is a development of Cleveland Graphite Bronze division of Clevite Corporation

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now the famous one-piece Morton OPEN-GRIP running board gives you

the UNI-WING flange

Stronger

Fully AAR approved

The rugged, die-formed flanges of the *new* Morton **Open-GRIP** running board *aid* installation, *eliminate* welded brackets.

Withstands rough treatment without damage.

Still the famous **Open-GRIP** KASS safety features and rigid edge construction for strength where it's needed.

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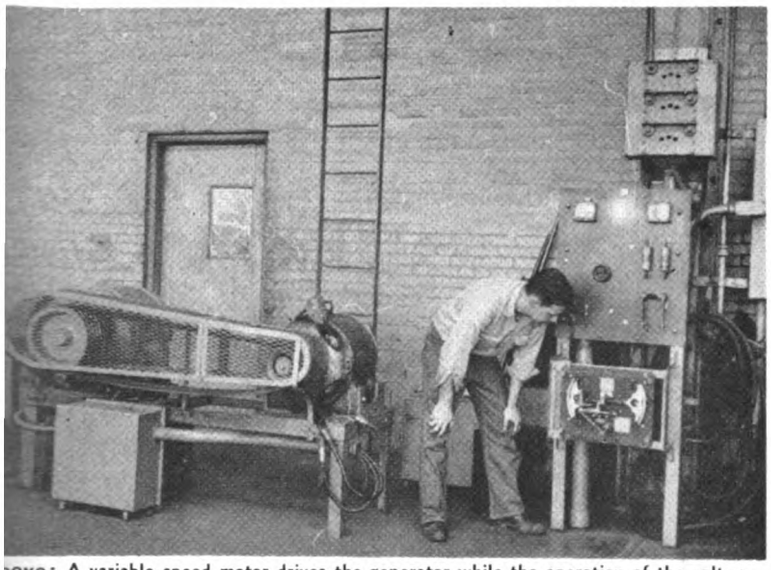
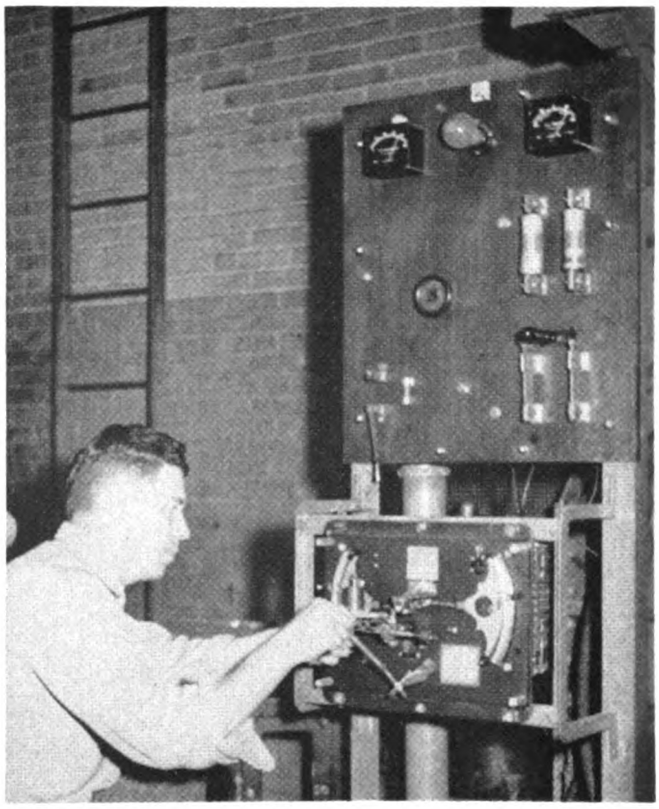




)ove: A variable-speed motor drives the generator while the operation of the voltage gulator on the test rack is observed. The load resistor is placed above the test panel.

t right: Wayne Sharp, who operates the test equipment, is shown adjusting a ltage regulator.

'est Stand Checks Generators and Regulators

THE EQUIPMENT shown in the illustrations for testing both auxiliary nd diesel locomotive voltage regulators vas developed in the West Burlington, owa shops of the Chicago, Burlington nd Quincy.

The generator to be tested is mounted n the stand at the left and is driven hrough four Vee-belts by a 15-hp vari-ble-speed motor. Mounting plates have been made up for a variety of mounting bolt positions to permit the testing of all makes of auxiliary locomotive generators and exciters. The generators are run at speeds of 800 to 2,200 rpm and are loaded at top speed on ½-ohm, 150-amp resistor.

When testing EMD equipment, the resistor on the voltage regulator is first set with an ohmmeter. It is then placed on the rack below the test panel and the generator is loaded at high speed while the operation of the regulator is observed. The spring tension is adjusted to give 72 to 76 volts.

If the generator voltage is not constant under all operating conditions, the regulator is checked for sticking parts or looseness and necessary adjustments are made.

On the board, there is also a generator field rheostat which can take the place of the voltage regulator on higher voltage generators.

From the Diesel Maintainer's Note Book

The Engine Ran Without Fuel

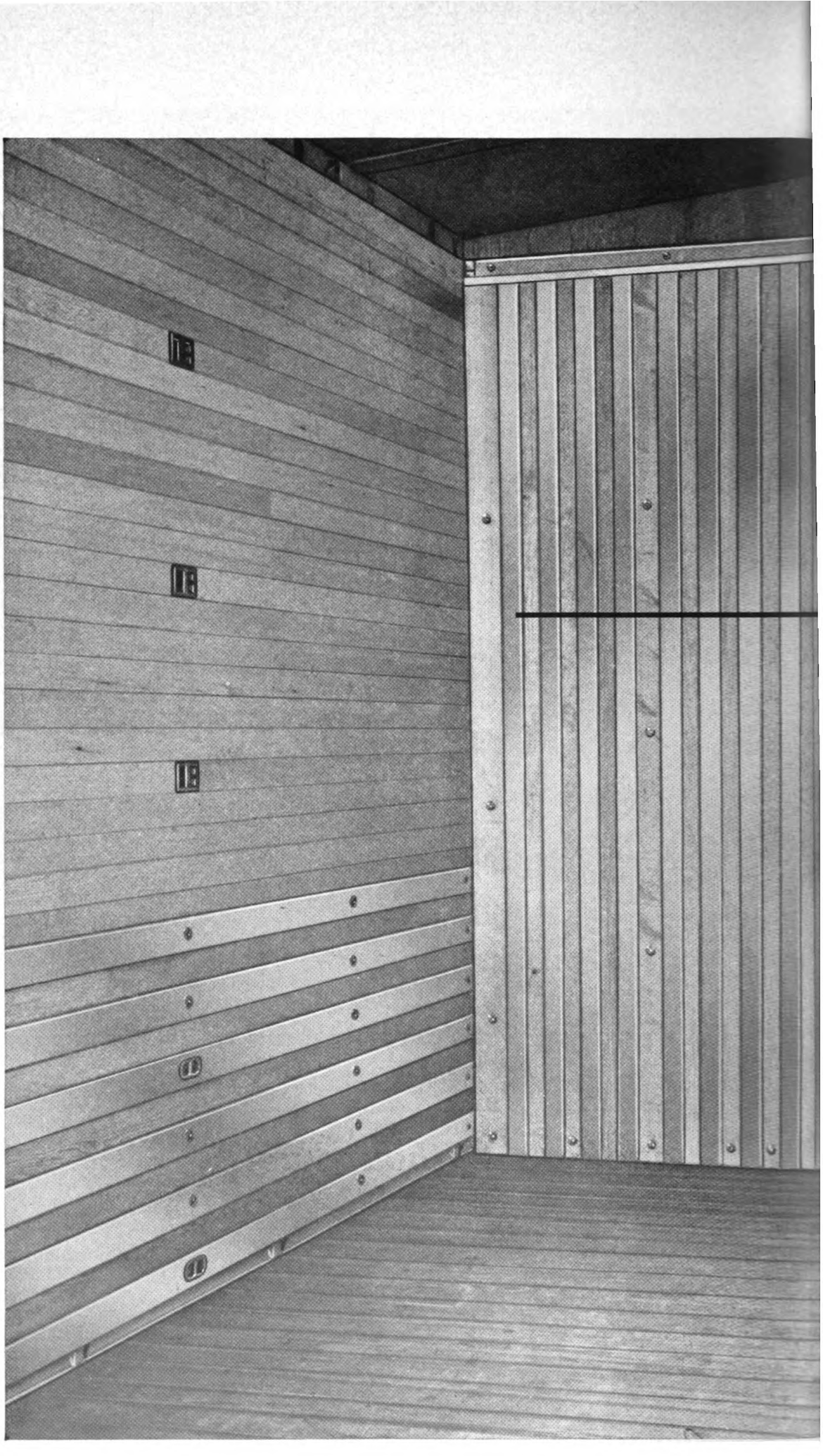
To the Editor:

ON PAGE 54 of the April 1958 issue of *Railway Locomotives and Cars,* an article appeared which was titled "The Engine Ran Without Fuel." The story concerned an EMD switcher, and the diagnosis of the problem was correct. However, there is one point which I would like to clarify.

Most of the EMD locomotives run the return fuel pipe down near the bottom of the fuel tank, usually in the vicinity of the suction line. This is done to keep the suction area in the tank warm during cold weather. There is normally a ¼-in. vent hole in the return pipe just below the top sheet of the tank which acts as a syphon break and prevents the injectors from taking fuel from the return line. Evidently this hole was missing on the unit discussed.

When this hole is omitted, the engine-mounted fuel filter 5-psi sight glass will remain full after shut-down, which will be an indication of trouble. The problem can be corrected by adding a ¼-in. hole in the return line just below the top sheet of the fuel tank or by terminating the return line at the top of the fuel tank.

MAX EPHRAIM, JR.
Locomotive Section Engineer
Electro-Motive Division,
General Motors Corporation



LINE-RITE

keeps more cars in the line-up!

This is the LINE-RITE team... End Lining and Side Lining

When one of your high class lading cars loses a lining board or takes a punch in the side from a fork lift truck, your profits are hurt. LINE-RITE End Lining and Side Lining were developed by Standard to keep your high class lading cars in service by adding strength to the interior of your cars.

Use Both Members of the Team!

By using both members of the team – End Lining *and* Side Lining, you achieve the greatest possible protection for your cars. You'll reduce the number of cars out of service and have lower maintenance costs. Here's the story:

Added Strength!

End Lining's assembled metal and wood lining gives additional strength to the end of the car by distributing impacts over a larger area and allowing the corrugations in the outer steel end to exert resistance to impact as a unit. And the Side Lining, *four times stronger* than ordinary wood lining, affords strong protection from damage by fork lift trucks and tractors.

Maintenance Costs Slashed!

Dovetailed metal sockets provide solid backing the entire length of the board . . . lock each board positively and securely in place. New LINE-RITE End Lining and Side Lining virtually eliminate many costly operations in repairing interior linings of your cars!

Infestation Hazard Reduced!

End Lining's continuous steel member, after proper application, provides a positive wall which effectively blocks the infiltration of flour and grain into the space behind the lining.

That's How LINE-RITE Works!

That's the LINE-RITE line-up. End Lining and Side Lining working together to help keep your high class lading cars in service . . . your maintenance costs low. It's a good team to have working for you. Your Standard representative will give you the facts.

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REPORT FROM A LEADING MIDWESTERN RAILROAD

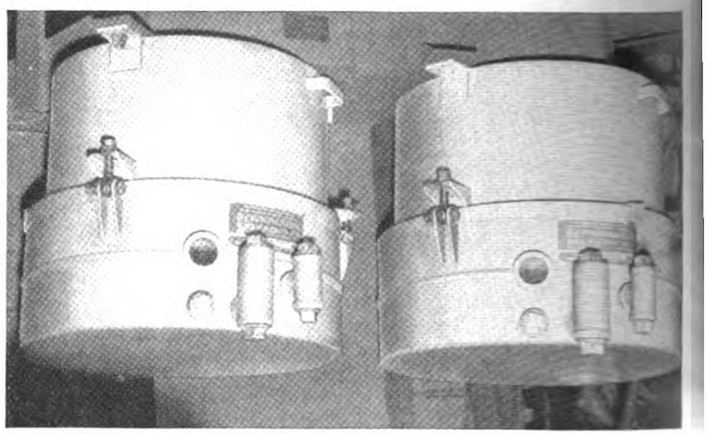
On 80 locomotives

...Air-Maze oil bath filters will

save thousands of dollars a year

by extending engine overhaul

Air-Maze Oil Bath Filter
removes 92% or more of all objectionable dirt from intake air. Photo shows installation on Alco 1500 horsepower freight unit.



The first Air-Maze oil bath filter installed on the air intake of a locomotive saved this railroad $4300.00 over a 27-month period. Since that time, 80 additional locomotives—switchers, road switchers, road freight and passenger locomotives—have been equipped with Air-Maze filters at the time of engine rebuilding.

Annual savings of $1900.00 realized by the first unit, have meant a return of over 300% on initial investment through reduced cost of power assembly changeouts and reduced cost of filter servicing. Because of reduced cylinder assembly wear and longer bearing life, plans are to extend engine overhaul periods 25% and more.

The only true, road-proved oil bath filter, Air-Maze provides effective air filtration at all engine speeds. It does not depend on air velocity to do an efficient filtering job. As a result, only clean, abrasive-free air enters the engine intake. The high dirt removing efficiency is unaffected by humidity or oil mist conditions.

Typical Air-Maze oil bath servicing consists of periodic filter oil changes in place usually at 3 or 6 month intervals and filter disassembly and complete cleaning at time of annual locomotive inspection.

Today over 3,000 Air-Maze oil bath filters are in use by over 75 domestic railroads . . . and many more now in foreign service.

For more information, write your locomotive builder or THE AIR-MAZE CORPORATION, Cleveland 28, Ohio. Dept. RL-6.

GEARED TO PRODUCE P R I MEMBER

The biggest names in diesels are protected by Air-Maze filters

AIR-MAZE
The Filter Engineers

ENGINE AIR FILTERS • CAR BODY FILTERS • LUBE OIL FILTERS • PASSENGER CAR FILTERS

B & O puts 2,000 new hopper cars in service

To provide customers with even better service throughout its vast system, the B & O is adding 2,000 triple-hopper cars to its present big fleet. Shown above is a string of these brand-new cars right after completion at Bethlehem's Johnstown, Pa., shops. They are now rolling on B & O main lines in several different states.

In building this order of 2,000 hopper cars, Bethlehem incorporated many cost-saving standard features. The cars are essentially of riveted construction, and all plates and rolled sections are copper-bearing steel to reduce corrosion. Wheels are wrought steel, one-wear.

Other points of interest are as follows:

Load capacity, nominal	70 tons
Cubic capacity, level	2773 cu ft
With 10-in. average heap	3098 cu ft
Light weight	49,500 lb
Length inside	40 ft 8 in.
Width inside	10 ft 4 in.
Height, rail to top of side	10 ft 8⅛ in.
Diameter of wheels	33 in.
Size of journals	6 in. x 11 in.
Slack adjusters	Manual

When you are next in the market for cars, either standard or special, let Bethlehem quote on your specifications. Our engineering staff and car-building shops are equipped to meet your needs in every detail.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
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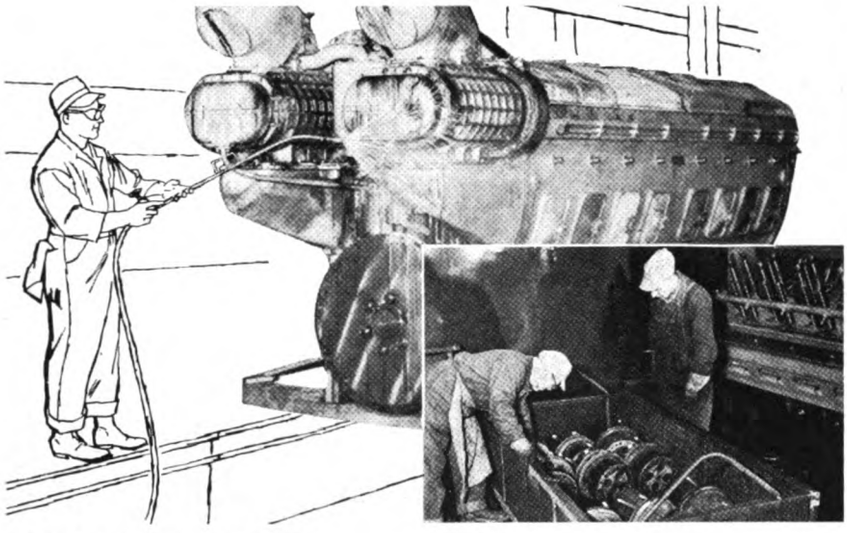

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cleaning efficiency

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cost on any job!

LIX DIESEL CLEANERS

Give Amazing Results!

DOWN go maintenance costs when a railroad uses LIX cleaners for diesel cleaning!

Through years of experience in the railroad cleaning field, Lix specialists have developed a line of cleaners which meet ideally the needs of today's railroads for fast, efficient, economical maintenance. There is a Lix cleaner for any diesel cleaning job, no matter how dirty—for application by spray or immersion.

With LIX cleaners, no scraping or brushing is necessary . . . they *soak* away all grit, grime and caked carbon. In tank-cleaning of parts, Lix cleaners are harmless to all metals during cleaning cycle . . . and all metals can be cleaned in same tank at same time. Lix cleaners have good emulsifying qualities . . . leave no granular deposits . . . reduce after-rusting. Lix cleaners are *safer*, too—are of low toxicity, are not a fire hazard, and have *longer life* without frequent charges.

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You owe it to yourself to investigate the definite advantages of LIX cleaners . . . to *prove* to yourself how you can save time and money on periodic surface cleaning of locomotives and on overall cleaning of diesel parts! *Write, wire or phone for a* LIX DEMONSTRATION *in your shop—without cost or obligation!*

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PRODUCTS OF RESEARCH
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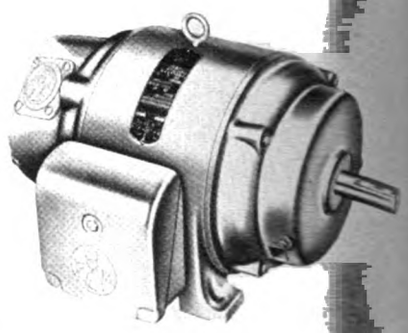
KANSAS CITY, MISSOURI
"Leadership in Industrial Cleaning"

What's New

(*Continued from page 22*)

zero applications, good elevated-temperature properties, and X-ray quality welds.

The Inco-Weld A wire comes in 36-in lengths in diameters of 1/16, 3/32, 1/8, and 5/ and on spools in smaller diameters. *International Nickel Company, Inc., Dept. RLC 67 Wall st., New York 5.*



Capacitor Motors

These capacitor-start, induction-run, single phase integral horsepower motors have been designed to provide high starting torque and operating efficiency. Capacitors of the dry electrolytic type and a rugged centrifugal switch are used.

These Type WCZK motors can drive pumps, fans, drill presses, lathes, sanders, circular saws and similar equipment. Drip proof, corrosion-resisant cast iron frames are used. Motors for 115/230 volt operation are available from 3/4 hp to 1½ hp at 1,200 rpm, 1 hp to 3 hp at 1,800 rpm, and 1½ hp to 5 hp at 3,600 rpm. *Fairbanks, Morse & Co., Dept. RLC, Chicago 5.*

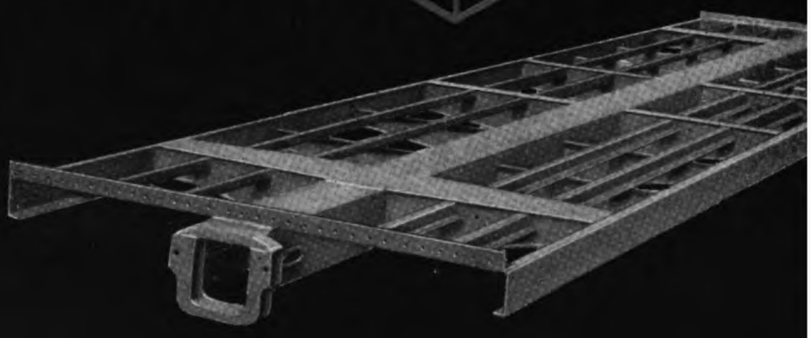
Locomotive Wiring Cable

This rubber-insulated, aluminum-sheathed cable, which is said to yield important space savings in the wiring of diesel locomotives, eliminates the need for conduit. The aluminum sheath is extruded over the underlying cable core and is not subject to the limitations in length found in some other aluminum-sheathed cables.

Besides eliminating the need for conduit and for separate pulling of wires, this construction is easily worked and can be fitted

(*Continued on page 62*)

this is the backbone of the very finest freight car in the world



We don't know what "brand" of freight car this is—nor do we care—because WE ARE NOT CAR BUILDERS

. . . but we do know that a man who knows enough about underframes to specify this one could not build anything less than the very finest freight car in the world!

INTERNATIONAL STEEL COMPANY
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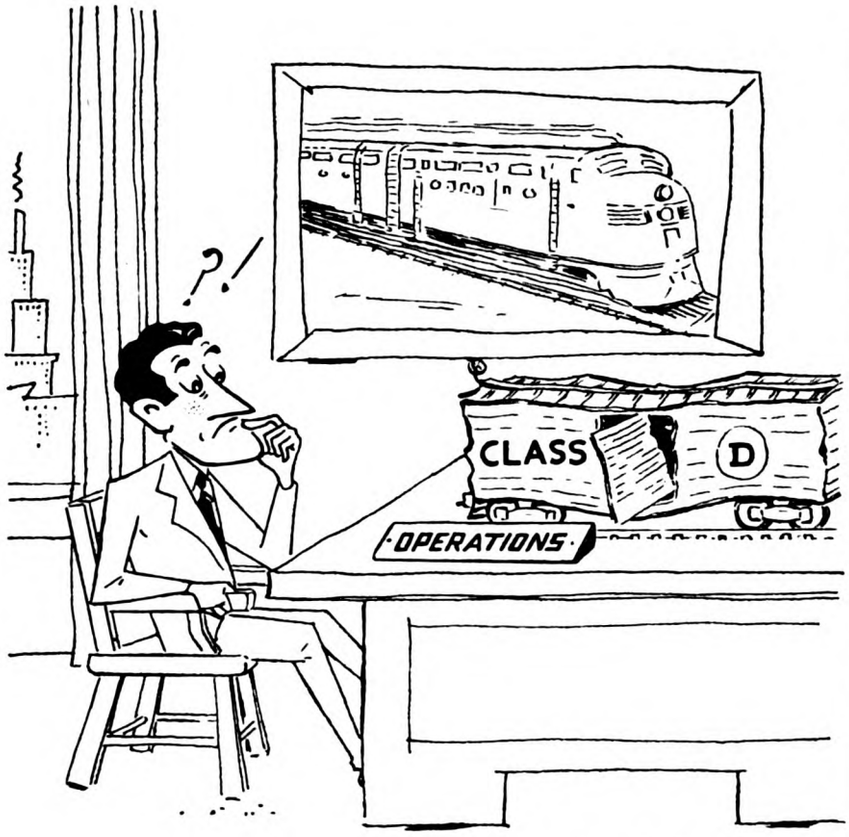
Precision fabricators of correctively designed components:
UNDERFRAMES . . . SIDE ASSEMBLIES . . . DOORS . . . BULKHEADS . . . FLOORS . . . HOPPERS



For the car "too-humped-to-help", most any upgrading is too costly. But where B and C cars must be made Class A and funds are limited, PLASTINAIL offers this:

1 — A super-smooth Class A floor

2 — That will outlast a new wood floor and remain in Class A service virtually all its life

3 — At as little as 2/3 the cost* of new wood.

*PLASTINAIL for 3/4" coverage of a 40'-6" box car is only $138.

Installation time: approximately 20 man-hours.

Write, wire or phone for details

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OXYCHLORIDE CEMENT BOX CAR FLOORS

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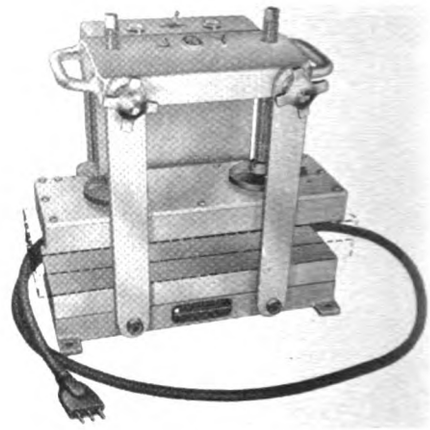
to the contour of the installation. It is moisture-proof and resistant to oils and other contaminating agents not corrosive to aluminum. *General Cable Corporation, Dept. RLC, 420 Lexington ave., New York 17.*



Vulcanizing Press

These molding presses for reinsulating and rejacketing natural rubber, synthetic rubber and thermoplastic covered cables, can accommodate standard cable types and sizes with the use of interchangeable aluminum molds. The presses carry a 3,000-watt rating and are available for operation on 7 standard a-c and d-c voltages. Heat from four replaceable strip heaters (two in the top and two in the bottom platen) is applied directly through the molds to areas being vulcanized at molding pressures of up to 25 tons. Twin tie bars can be dropped for front loading and permit using this press to create Y and T splices. *Joy Manufacturing Company, Dept. RLC, 1201 Macklind ave., St. Louis 10.*

Reflective Striping

A Scotchlite reflective sheeting, pre-masked to simplify two-ton railroad car and locomotive painting and trim line striping, is a colored striping which is applied to the car before painting. The mask on the face of the striping protects it when the background finish coats of paint are applied. After these background coats are on, the mask is removed from the trim line. The paint thus "edge seals" the reflective sheeting.

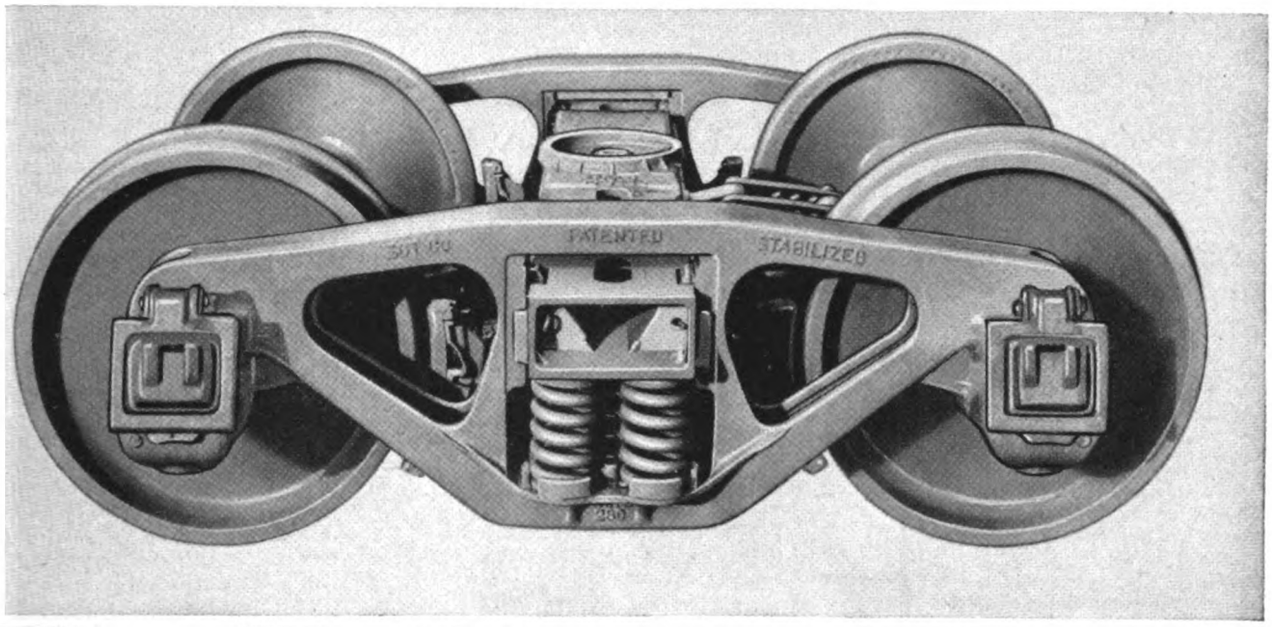
The sheeting is also available pre-masked in reporting numbers, letters and insignia. *Minnesota Mining & Mfg. Co., Dept. RLC, 900 Bush st., St. Paul 6, Minn.*

Steel Abrasive

Rotoblast Steel Shot, a steel blast cleaning abrasive, has a narrow hardness range, extreme uniformity, density and toughness. Available in all standard SAE sizes, Rotoblast Steel Shot is manufactured by vacuum cast continuous process of high quality electric furnace alloy steel. It is then heat treated. The abrasive is shipped in 50-lb double burlap bags. *Pangborn Corporation, Dept. RLC, P.O. Box 380, Hagerstown, Md.*

World's Easiest Truck Servicing

BEGINS WITH



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STABILIZED TRUCKS

Less service time and costs add up to important savings. So, experienced freight car designers naturally "Begin With Barber Stabilized Trucks." Because: When necessary to service Barber parts, friction castings, wear plate and side springs are removed and replaced *5 to 10 times faster* than those of other trucks . . . can be inspected at a quick glance. Result of the *more than 475,000 Barber car sets sold,* none has ever worn out!

Standard Car Truck Company, 332 South Michigan Avenue, Chicago 4, Illinois. *In Canada:* Consolidated Equipment Company, Ltd., Montreal 2, Quebec.

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NEW SERIES

HOW-TO-DO-IT ARTICLES

on Commutator and Slip Ring Maintenance

Years of experience are packed into this new 6-article series — each an invaluable guide for keeping commutators and slip rings at peak performance.

Each article discusses a major part of the overall problem — gives practical tips on maintenance — tells how to solve common problems — what to do and how to do it — in easily read shop language. Supplied in attractive folder, forming complete maintenance data file.

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Please send free folder and article No. 1 of series "Commutator and Slip Ring Maintenance."
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MANUFACTURERS HELPS FROM

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

WELDING WIRE. 84-page Aircomatic Welding Wire Pocket Guide (Form ADC 873) has quick and convenient answers to questions about welding wire for use with Airco's gas-shielded metal arc welding process. Presents varieties of wire types and wire diameters and technical data on chemical composition, mechanical properties, and operating procedures. (Write: *Air Reduction Sales Company, a division of Air Reduction Company*, Dept. RLC, 150 East 42nd st., New York 17.)

FLANGE COLLARS. Information sheet describes new 3LC flange collar for use with Huckbolt fasteners. Part number, dimensions, collar material and finish data tabulated. (Write: *Huck Manufacturing Company*, Dept. RLC, 2480 Bellevue ave., Detroit 7.)

MILLING MACHINES. 46-page catalog M-2003 describes completely the Nos. 2, 3 and 4 plain, universal, and vertical Dial Type milling machines. (Write: *Cincinnati Milling Machine Company*, Dept. RLC, Cincinnati 9.)

ALL-PURPOSE FLAT CAR. 10-page booklet describes the PS-4 all-purpose flat car. Details of construction shown in exploded views. (Write: *Pullman-Standard Car Manufacturing Company*, Dept. RLC, 221 North La Salle st., Chicago 1.)

ABRASIVES. 8-page booklet tells how abrasives are used in the railroad industry to step up production and cut grinding and finishing costs. (Write: *Minnesota Mining & Manufacturing Co.*, Dept. RLC, St. Paul 6, Minn.)

COUPLERS. Two charts, printed on heavy stock for display, show progressive steps in the assembly of the Type F and the AAR Type E couplers, respectively, the latter both for rotary and top operation. Coupler parts illustrated. (Write: *National Malleable & Steel Castings Co.*, Dept. RLC, 10600 Quincy ave., Cleveland 6.)

TANK CAR PARTS. Nine-pound parts catalog listing 1,206 tank-car parts, each with a detailed engineering drawing, covers all anticipated replacement needs. For distribution to owners or leasers of ACF tank cars only. (Write: *ACF Industries, Inc.*, Dept. RLC, 30 Church st., New York 8.)

MOTOR NOSE SUPPORT. 4-page Bulletin No. 709 describes a compact, bonded-rubber traction motor nose support for cushioning road shocks and sudden torque impulses. Diagrams explain installation of the units on locomotives. Tabulates applications on current production models of diesel-electric locomotives. (Write: *Lord Manufacturing Company*, Dept.. RLC, Erie, Pa.)

GONDOLA CARS. 4-page bulletin includes specifications and general arrangement drawing of the Greenville GV-4 65-ft 6-in. gondola. Basic specifications on Greenville's other package cars—flat, cover hopper, and hopper—also given. (Write: *Greenville Car Company*, Dept. RLC, Greenville.

BATTERIES. Bulletin IT-526/58 covers use, design, and construction of new Explosion-Proof Slyver-Clad batteries for applications. (Write: *C & D Batteries*, Dept. RLC, Washington and Cherry Conshohocken, Pa.)

"THERMALASTIC — THE INSULATION SYSTEM." 12-page booklet (B-7249) describes advantages of Thermalastic insulation for large motors and generators, synchronous condensers, and frequency changers. Chart compare the insulation with asphalt-bonded mica insulation as to power factor, tensile strength, voltage endurance, and dielectric strength, and water-proof characteristics. (Write: *Westinghouse Electric Corporation*, Dept. RLC, P.O. Box 2099, Pittsburgh 3

CARBON AND GRAPHITE BRUSHES. 8-page bulletin, "Brushes for Electrical Rotating Machinery," tells how to select the right brush for a specific job and discusses brush materials, brush design, and the Multiple line of split brushes. Separate sections devoted to brushes for alternating and direct current equipment. (Write: *Speer Carbon Company*, Dept. RLC, St. Marys, Pa.)

LUBRICATION OF ANTI-FRICTION BEARINGS. 30-page booklet describes fundamentals of operation and lubrication of types of anti-friction bearings. Charts show tolerance standards, load-carrying capacity and minimum bearing life. Methods of using oil and grease lubrication also given with operating notes on load carrying capacity and bearing life as affected by vibration, shock, misalignment, high operating temperatures, etc. (Write: *Socony Mobil Oil Company*, Dept. RLC, 150 East 42nd st., New York 17.

LIGHTING VOLTAGE REGULATOR. 8-page bulletin (GEA-6676A) describes the rotary type lighting voltage regulator for railway passenger cars. Contains outline drawing of regulator and a diagram of the regulating system. Typical installation sh (Write: *General Electric Company*, RLC, Schenectady 5, N.Y.)

ELECTRIC MOTOR CLEANING. Bu "The Cleaning of Electric Motors," contains information on procedures for cleaning motors and generators, hazards present using solvents, and how to select a efficient solvent. (Write: *Fine Organics*, Dept. RLC, 211 East 19th st., New York

MANIFOLDS FOR GASES.—20 page F ADC 636D describes complete line of A manifolds for gases, with specific information regarding cylinder capacity, cylinder arrangements, and dimensions. (Write: *Air Reduction Sales Company, a division of Air Reduction Company*, Dept. RLC, 150 East 42 st., New York 17.)

HAND HOISTS. 8-page Bulletin DH-1 gives specifications, clearances, and dimensions for line of Wright Safety hand hoists from ½ ton to 50 tons. (Write: *Hoist Division, American Chain & Cable*, Dept. RLC, York Pa.)

America's foremost engineered lettering tools

designed to reduce your present costs

50 to 80%

Used today by 1/3rd of the Nation's leading Railroads . .

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STENCILS

PRESSURE SENSITIVE TYPES

Easy to apply. No skill required. Produces the most accurate and durable type of lettering, numerals, medallion, and other types of markings. Adds long life to your identification or advertising on all your equipment . . .

Whatever your lettering problems may be regarding identification, advertising, reflective or non-reflective, the DEMP-NOCK LETTERING SYSTEMS can help you get the job done in less time.

For additional information write Dept. RR-100

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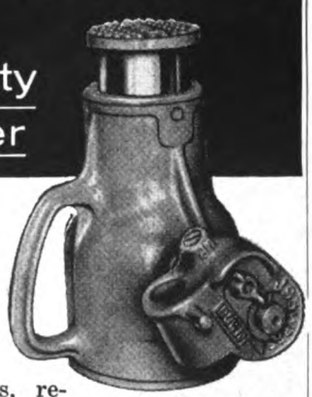
DEMP NOCK

WESTERN LOCOMOTIVE and CAR JACK

lifts capacity

loads easier



WESTERN has made the first major change in Locomotive and Car Journal Jacks by adding TIMKEN tapered thrust roller bearings, replacing ball bearings. This major improvement means reduced friction, greater speed, easier operation and less maintenance . . . available in 25, 35 and 50 ton capacities. Aluminum or malleable steel housings available in 25 or 35 ton models.

8018

Write for Bulletin No. 1957

WESTERN RAILROAD SUPPLY COMPANY

Division of Western Industries, Inc.

2400-2434 S. Ashland Ave., Chicago 8, Ill.

Slash assembly and repair time on railroad rolling stock

ROUND

CL HUCKBOLT FASTENERS

TRUSS

FLAT

COUNTERSUNK

ROOF TO SIDE

ROOF TO END

END TO SIDE

THRESHOLDS

FLOORS

● **Whatever the job . . . CL Huckbolts are being used by modern car builders and repair shops to slash assembly time, conserve manpower, and keep the stock rolling.**

Driving CL Huckbolts is so simple and easy that 25 can be installed with ONE gun in ONE minute.

With CL Huckbolts you get positive sheet pull-together, no bulbing between sheets and since no human factor is involved in the driving operation, completely uniform tension.

The smooth, flat head and the tension preload properties of the CL Huckbolt make it safe for bagged or packaged lading and prevents water trapping and decay when used for flooring.

Complete information and samples are available from your local Huck Representative—or write . .

HUCK *MANUFACTURING COMPANY*

2480 BELLEVUE AVE. • DETROIT 7, MICH. • PHONE WALNUT 1-6207

Supply Trade Notes

TURCO PRODUCTS, INC.—*Archie K. Beard* has been appointed general sales manager.

■

GARLOCK PACKING COMPANY.—*Thomas L. Denney,* special assistant to the vice-president - marketing, has been appointed general sales manager.

■

ACF INDUSTRIES, INC.—The executive offices of ACF Industries and its Advanced Products, American Car & Foundry, and Shippers' Car Line Divisions have been removed from 30 Church street, to 750 Third avenue, New York 17.

■

HUNT - SPILLER MANUFACTURING CORPORATION.—Hunt-Spiller has been appointed to handle the exclusive railroad sales for ni-resist ring carriers, also the application of new carriers to used pistons, formerly furnished by the *Ohio Piston & Machining Co.* of Cleveland.

■

UNITED STATES STEEL CORPORATION.—*J. Gardner Brooks,* assistant manager of sales, Chicago, has been appointed manager of sales, Indianapolis, to succeed *Gladstone C. Hill,* transferred to St. Paul, Minn. *Jack R. Scott,* assistant to manager of sales, Chicago, succeeds Mr. Brooks at Chicago.

A. K. Beard

T. L. Denney

R. M. Beswick

W. S. Morris

WESTINGHOUSE AIR BRAKE COMPANY.—*R. M. Beswick,* general sales manager, has been appointed vice-president-sales, Air Brake Division, Wilmerding, Pa. Mr. Beswick has been with Westinghouse Air Brake for 29 years in engineering and sales capacities. in Wilmerding, New York and Washington, where he was district manager before becoming general sales manager in 1956. He is a graduate in mechanical engineering, University of Pittsburgh.

■

DUFF-NORTON COMPANY.—*Donald A. Anderson* has been appointed district sales manager, covering New York State and New England.

■

EX-CELL-O CORPORATION.—*L. Graham Collins* has been appointed a sales representative in the New York-New Jersey area, working with *W. M. Thompson,* district manager.

ALCO PRODUCTS, INC.—*William Morris,* executive vice-president, has been elected president, succeeding *Perry T. Egan,* who has been elected chairman.

Mr. Morris began his career with Alco as a special apprentice at Schenectady in 1924. He was subsequently a sales representative and, later, district manager at Chicago. He was elected vice-president of the Montreal Locomotive Works in 1940 and executive vice-president in 1944. Later in 1944 he was transferred to Alco's New York office as vice-president.

■

SPERRY PRODUCTS, INC.— *Richard Neiley* has been appointed district sales supervisor, with headquarters in Chicago. Mr. Neiley's name incorrectly appeared without note on Sperry Rail Service on page 54 of the May issue.

■

PYLE-NATIONAL COMPANY.—*James Baker,* Cleveland district manager, has retired.

■

UNION TANK CAR COMPANY.—*J. Van Gorkom* and *D. C. Graves* have been elected vice-presidents. Mr. Van Gorkom continues as treasurer.

■

ASSOCIATED RESEARCH, INC.—*Arthur H. Lynch & Associates, Inc.,* have been appointed engineering sales representative for the state of Florida, with headquarters in Fort Myers, and branch offices in Miami and Gainesville.

■

ALUMINUM COMPANY OF AMERICA—*B. J. Fletcher,* general manager of engineering, has been elected a vice-president.

■

TIMKEN ROLLER BEARING CO.—The railroad-car roller-bearing plant at Columbus, Ohio, with capacity to produce 20,000 sets per year, was demonstrated to the business press on May 15. This highly mechanized facility, built at a cost of over $7,000,000 will be described more fully in the July issue.

■

DAYTON RUBBER COMPANY.—*Norman G. Lever* has been appointed sales manager for the Industrial Division at Dayton, O. *Thomas E. Farrell* succeeds Mr. Lever as midwest regional manager, with headquarters in Chicago, and *K. C. Sparks* succeeds *K. Harvey* as regional manager for the west coast.

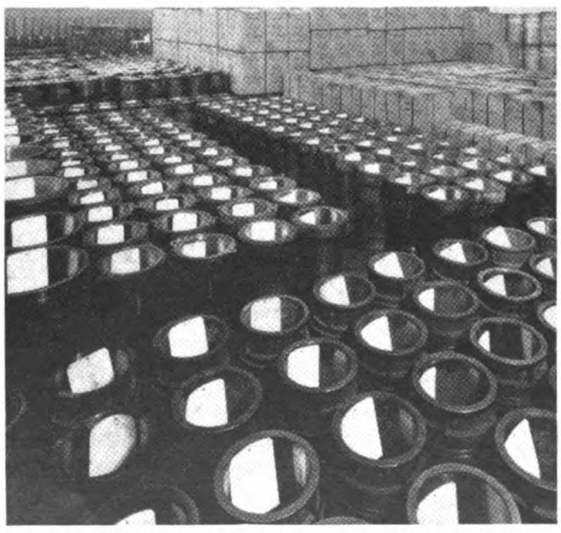
■

AEROQUIP CORPORATION.—*William Rogge,* general sales manager of the Industrial Division, has been appointed general manager of the Division, with headquarters at Jackson, Mich.

(*Continued on page 68*)

"Old Timers" among liners are
MECROME PLATED LINERS

Most "old timers" among liners in service today are Mecrome plated liners! Our unique plating process increases liner life by evenly distributing the pockets that retain the lubricating oil throughout the chromium-plated liner surface. This creates a strong bearing surface, without hard or soft spots and results in long engine life, rapid "break-in" cycles and superior lubrication. Send us a trial order today!



This sea of liners is typical of the thousands of liners being processed continually in the plants of Metal Finishers, Inc.

MECROME*
FIGHTS FRICTION TO THE FINISH*

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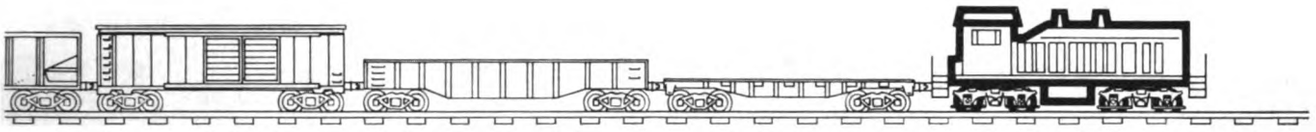
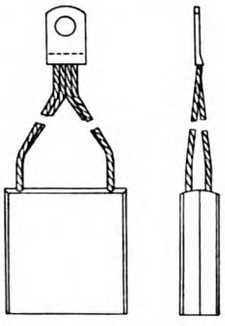
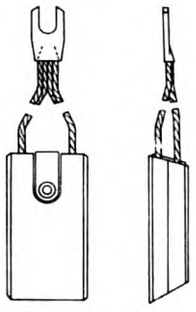
3125 BRINKERHOFF ROAD • KANSAS CITY, KANSAS
IN CANADA: NATIONAL HARD CHROME PLATING CO. LTD., TORONTO, ONT.

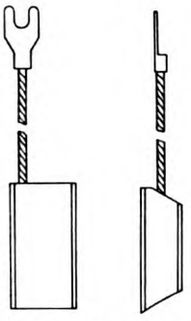




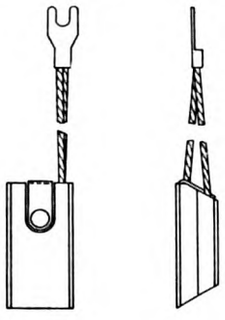
Speer Brush No. 3488-E46
For EMD, MOT.—D7, D17, D27, D37, 716E2, 721 721A2



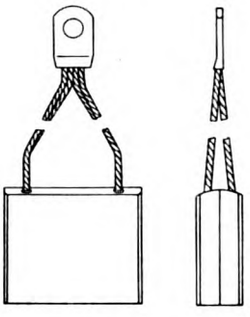
Speer Brush No. 3684-E44
For EMD, GEN.—D12, D15



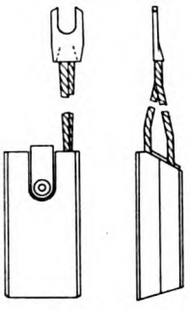
Speer Brush No. 4216-E35
For EMD, AUX GEN. — A3001 A7159
BLOWERS—A7158, A7160, A8101



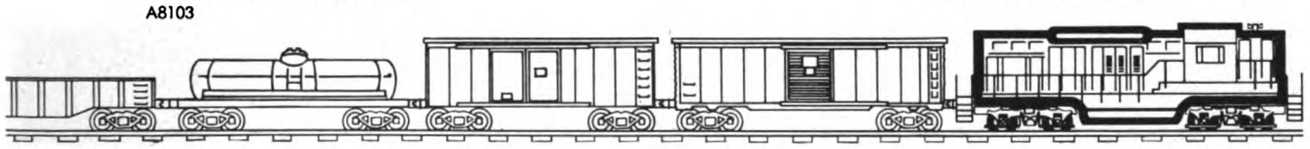
Speer Brush No. 4692-E35
For EMD, AUX GEN — A3001, A7159, A8102
BLOWERS—A7158, A7160, A8101, A8103



Speer Brush No. 3602-E34
For GE, MOT —726 730, 752



Speer Brush No. 3717-E44
For GE, GEN — GT564B1, C1; GT566C1, D1; GT567; GT569; GT576; GT581A1; GT586; GT571

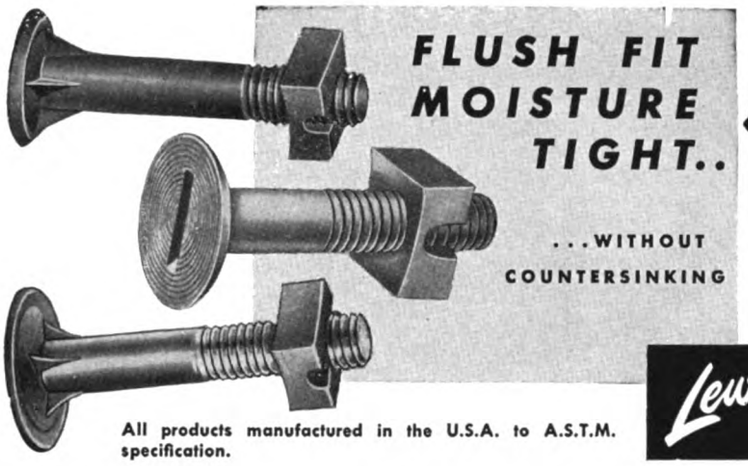


DON'T HAVE A BRUSH WITH TROUBLE . . . SPECIFY SPEER!

FOR TRACTION MOTORS . . . GENERATORS . . . AUXILIARY GENERATORS . . . BLOWERS

It pays to replace with a genuine SPEER Brush! With Speer brushes for every type diesel-electric locomotive, you're assured of even wear, reduced vibration, improved commutation, longer service life. How do we know? Millions of Speer railroad brushes have proved it Whatever the brush application, there's a Speer Brush that's "just a little better." Write for all the facts...and prices. Send today for your free copy of the informative booklet, BRUSHES FOR ELECTRICAL ROTATING MACHINERY!

SPEER Carbon Co.
St. Marys, Pa.



FLUSH FIT MOISTURE TIGHT..

...WITHOUT COUNTERSINKING

All products manufactured in the U.S.A. to A.S.T.M. specification.

Lewis sealtite car bolts

Each Lewis Sealtite car bolt has special "wood engineering" beveled head for flush, moisture tight, fit . . . without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning . . . slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

Lewis BOLT & NUT COMPANY
504 Malcolm Ave. S. E.
MINNEAPOLIS 14, MINNESOTA

LOOK FOR THIS STAMP OF U QUALITY

William E. Olds

W. E. Bikle

STANDARD RAILWAY EQUIPMENT MANUFACTURING COMPANY.—*William E. Olds,* vice-president in charge of sales, has been appointed president and general manager of the railway equipment division. *William E. Bikle* has been named general sales manager.

■

DAYTON RUBBER COMPANY.—Dayton plans to construct a one-story mechanical rubber goods plant in Springfield, Mo. The structure will have a manufacturing area of approximately 175,000 sq ft.

■

STRATOFLEX, INC.—New officers of the company which headquarters at Fort Worth, Tex., are: *K. W. Davis,* president and general manager; *D. H. Thornbury,* vice-president, and *C. A. Thomas,* vice-president - sales.

■

GENERAL AMERICAN TRANSPORTATION COMPANY.—*Piggyback, Inc., producer* of the Clejan or center-sill flatcar specially designed for piggyback service has been pu chased by the General American.

Obituary

GEORGE V. SLOTTMAN, vice-pres —research and engineering, of Air Red Company, died on April 21 at New York

■

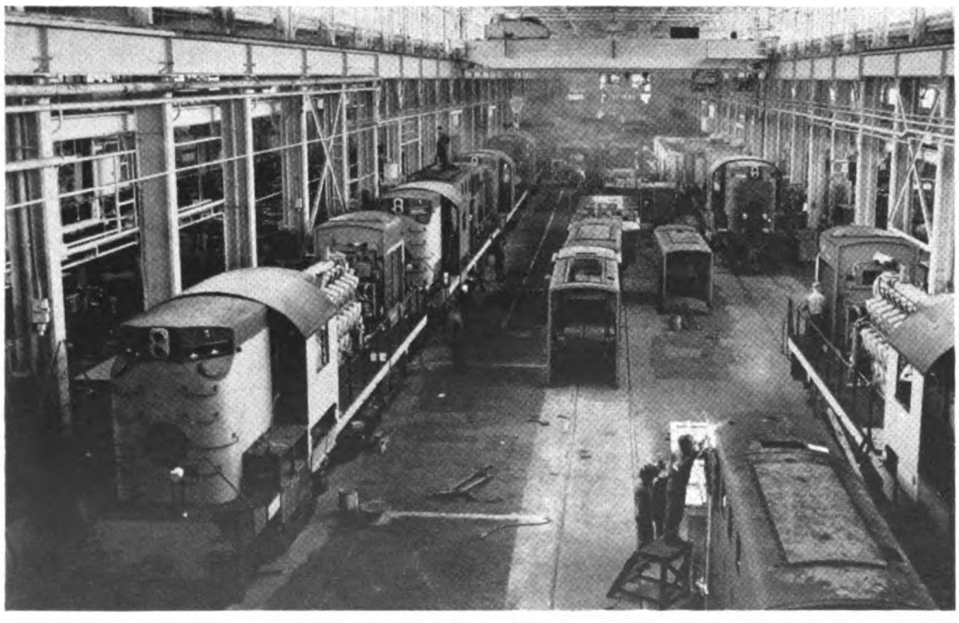
CARLTON F. OWENS, president, Inte national Railway Supply Company died April 13 at Santa Barbara, Calif.

■

LYLE G. HALL, past president of Stackpole Carbon Company, died on A 28 at the age of 71.

■

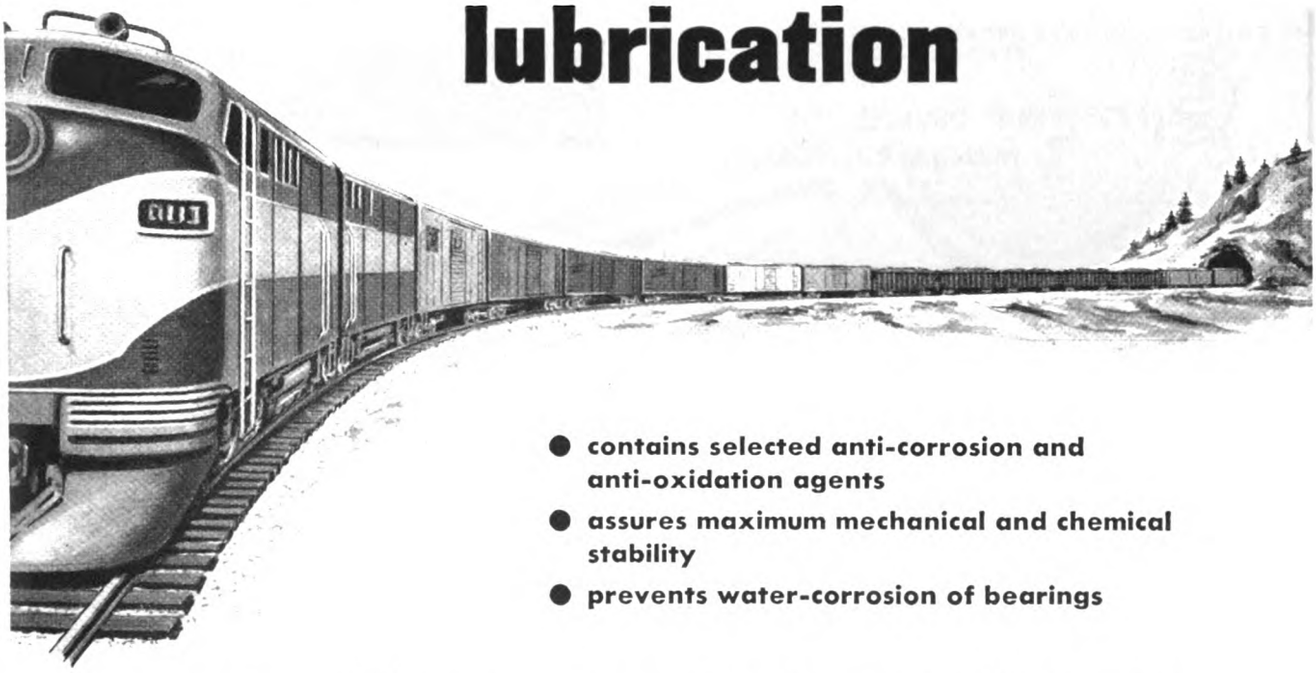
JAMES D. GLENN, former vice-presi and general manager of sales for the Cr Steel Company of America, died on M after a long illness.



Production-line locomotive assembly has been established by Alco Products in a 1,190-ft building formerly used as the general welding shop at the Schenectady, N. Y., plant. Three straight, multi-station assembly lines and related subassembly areas in Building 62 (left), a special shop area for stripping locomotives returned for remanufacture, and a General Engineering Laboratories Center are all part of the $4,000,000 modernization program. The new set-up made it possible to retire buildings used for steam locomotive manufacture and, at the same time, decrease material-handling requirements while centralizing prefabrication and assembly operations. The new asse shop is divided into two sections with underframes and side trusses fabric and assembled at the south end (rear, left), and the complete locomot then assembled on the three production tracks in the north end (foregrou Completed locomotives then go to paint booths (illustration at right load test sections. The new facilities "are tangible evidence of our fa your future," Alco board chairman P. T. Egbert stated in a messag American railroads in conjunction with the opening of the new facilities

AAR APPROVED

NEW SHELL ALVANIA GREASE B for journal roller bearing lubrication



- contains selected anti-corrosion and anti-oxidation agents
- assures maximum mechanical and chemical stability
- prevents water-corrosion of bearings

Developed specifically for railroad service, Shell Alvania Grease B is a new improved lithium 12-hydroxy stearate grease. It has been tested and approved under AAR specification M-917-56 for journal roller bearing lubrication.

Alvania® Grease B is formulated to provide excellent lubrication and eliminate water-corrosion and grease leakage problems.

For more complete technical information on Shell Alvania Grease B, contact your Shell Railroad Service Engineer.

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, N. Y.
624 S. MICHIGAN AVE., CHICAGO 5, ILL., 100 BUSH STREET, SAN FRANCISCO 6, CALIF.

SHELL

EQUIPPED WITH AIR-PUSH OF COURSE!

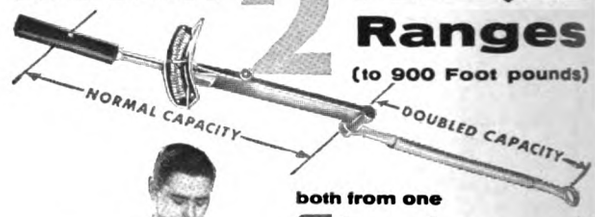
SPRAGUE AIR-PUSH WINDSHIELD WIPER MOTORS ARE "STANDARD" IN THE INDUSTRY

First in heavy duty windshield wiping equipment for a quarter century . . . . used on more than 90% of all diesel operated locomotives. *Safety starts with seeing* and Air-Push equipment keeps windshields clear in bad weather. Designed for top performance with minimum maintenance. Air-Push Replacement Kits, and Air-Push Repair Kits immediately available.

WRITE FOR COMPLETE DETAILS!

Sprague DEVICES, INC.,
Michigan City, Indiana

NOW... 2 TORQUE Ranges (to 900 Foot pounds)



both from one STURTEVANT TORQUE WRENCH

Now you can do high torque work with a Sturtevant Torque Wrench of normal capacity range—small in size—light in weight—with fine increment markings and moderately priced.

With a new Multi-range, Multi-purpose Adapter you can step up the capacity of your Torque Wrench to a new high range and you can plug in any drive end you want . . . Box wrench, ratchet, drive square for sockets.

All drive end accessories are interchangeable and stock items.

In this way each Sturtevant Torque Wrench effectively equals two complete sets of ordinary single purpose Torque tools.

WIDE CHOICE OF INTERCHANGEABLE DRIVERS

Only Torque wrenches with the Sturtevant patented pivoted handle can be accurate with adapters.

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—ADVERTISERS IN THIS ISSUE—

Air Maze Corp. 58
Albertson & Co., Inc. 37
American Steel Foundries 16, 17

Bethlehem Steel Co. 59
Buckeye Steel Casting Co., The 47

Cincinnati Grinders, Inc. 26

Demp-Nock Company 65

Electro-Motive Division, General Motors Corporation 20, 21
Esso Standard Oil Co. 49
Ex-Cell-O Corporation 43

Fairbanks-Morse & Co. 12, 13

Huck Manufacturing Company 65

Ideal Industries, Inc. 64
Institute of Thread Machiners, Inc. 51
International Nickel Company, Inc. 11
International Steel Company 61

Journal Box Servicing Corporation 41
Joy Manufacturing Company 9

Lewis Bolt & Nut Co. 68
Lix Corporation 60

Magnus Metal Corporation 24, 25
Metal Finishers, Inc. 66
Miner, Inc., W. H. ..... Inside Front Cover
Morton Manufacturing Company 54

National Carbon Company, Div. of Union Carbide Corp. 4
National Electric Coil Company 3
National Malleable & Steel Casting Co. ..... Inside Back Cover

Oakite Products, Inc. 15

Pullman-Standard Car Mfg. Co. 6

Research Products Manufacturing Company 19

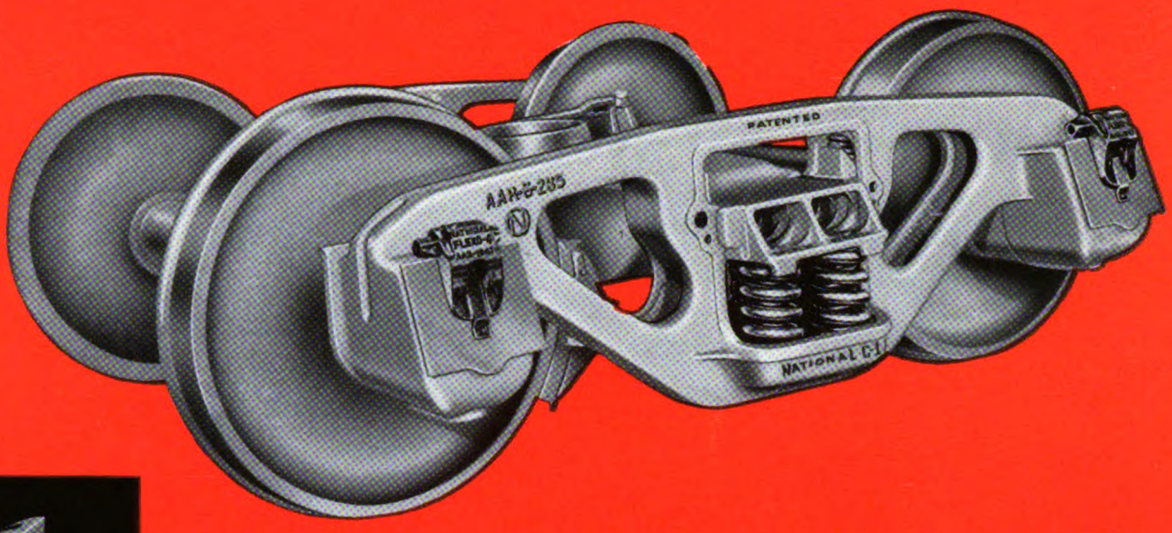
Schundler & Co., Inc., F. E. 62
Shell Oil Company 69
Sinclair Refining Company 44, 45
Speer Carbon Co. 67
Sperry Rail Service, Division of Sperry Products, Inc. 10
Sprague Devices, Inc. 70
Standard Car Truck Company 63
Standard Car Truck (Clevite Div.) 53
Standard Oil of California 23
Standard Railway Equipment Co. 56 57
Sturtevant, P. A. 70

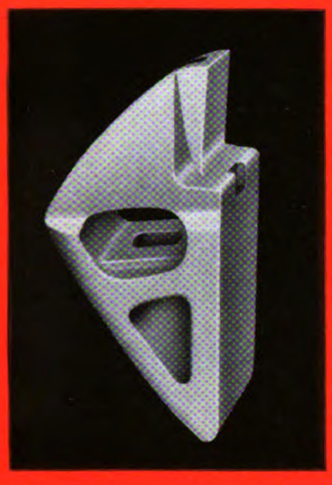
Timken Roller Bearing Co. ..... Back Cover

Union Carbide Corporation, National Carbon Company 4

Waukesha Motor Company 7
Western Railroad Supply Co. 65
Wine Railway Appliance Co. 38, 39

"This index is an editorial feature maintained for the convenience of readers. It is not a part of the advertiser's contract and Railway Locomotives & Cars assumes no responsibility for its correctness."





THE WEDGE

Key

to lower maintenance in

NATIONAL C-1 TRUCKS

In National C-1 Trucks, longer wedge life results from design of the friction mechanism itself, and the special analysis materials of which the wedge and wear plate are made.

Actual service records on leading railroads prove that National C-1 Truck Wedges are still in prime condition—even after traveling the equivalent of 8 times around the world.

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COUPLERS
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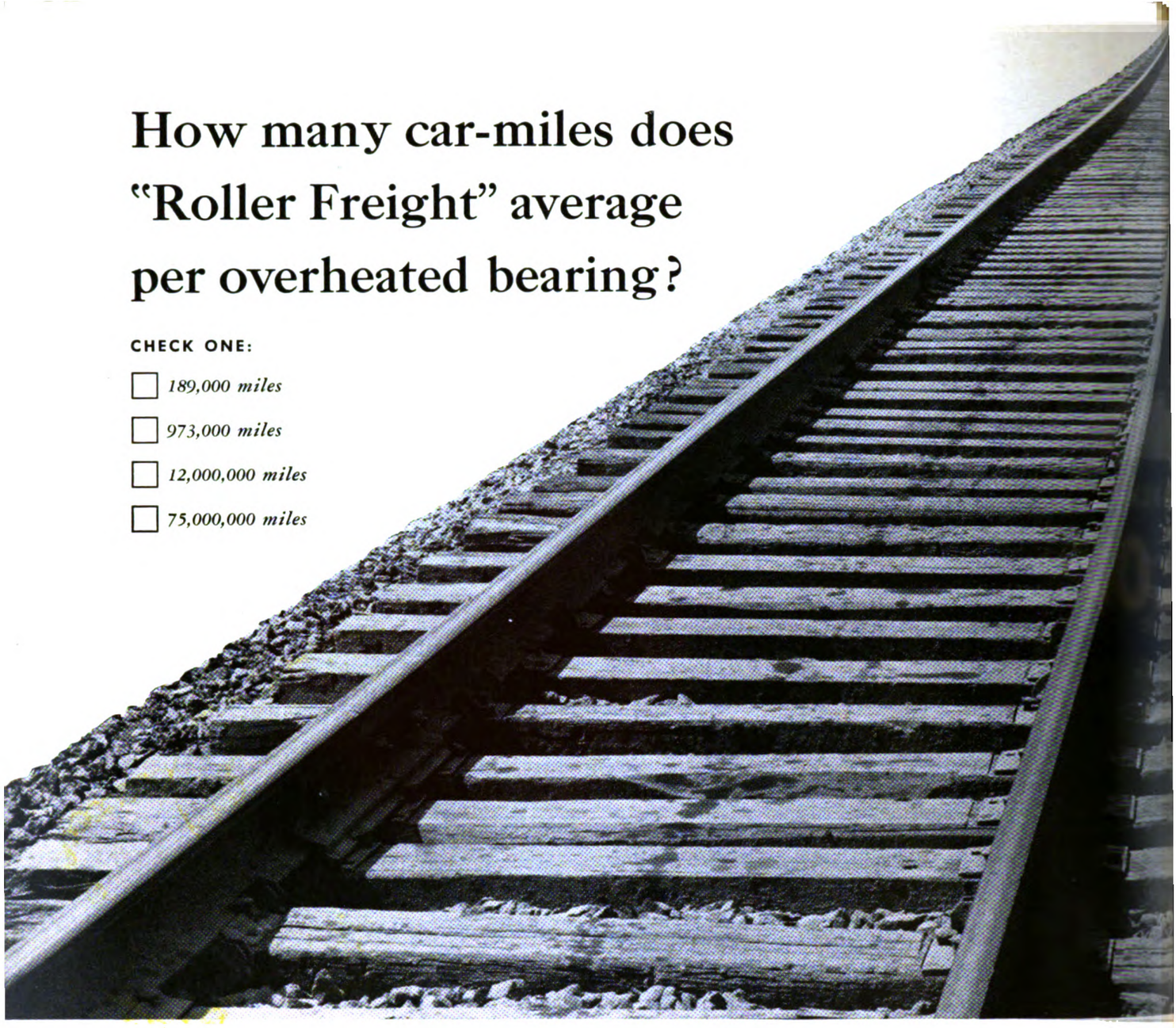
How many car-miles does "Roller Freight" average per overheated bearing?



CHECK ONE:

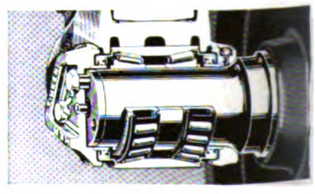
- ☐ *189,000 miles*
- ☐ *973,000 miles*
- ☐ *12,000,000 miles*
- ☐ *75,000,000 miles*

75 *MILLION* CAR-MILES per overheated bearing. That's the average mileage based on reports from railroads using "Roller Freight"—cars on Timken® tapered roller bearings. And one railroad has gone over 300,000,000 car-miles with only one overheated bearing. Friction bearings average only 189 *thousand* car-miles between hot box setouts alone. The mileage per overheated bearing is probably less than 50,000. And even these low mileage figures are shrinking fast.

Timken roller bearings *roll* the load. They eliminate the metal-to-metal sliding that causes friction bearings to get hot. That's the big reason why 67 railroads and private car owners already have over 25,000 "Roller Freight" cars in service or on order. And 52 of these freight car owners are teaming up by putting their "Roller Freight" cars in interchange—a total of over ⅓ of all "Roller Freight" cars.

These railroads are sharing the benefits of "Roller Freight" with other lines to speed the day when all freight is "Roller Freight". The day when the railroads will save an estimated $224,000,000 a year or about $113 per car in maintenance and operating costs—by licking the hot box problem, by cutting terminal bearing inspection time 90%, by cutting lubricant cost as much as 95%.

We'll be glad to show you how much Timken bearings will save on your new equipment. How planned conversion can put your present cars on Timken roller bearings—let you spread the cost over a period of years. Get Timken bearings for your freight cars. More roller bearing cars *roll* on Timken bearings than any other make. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



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The next great step in railroading is "Roller Freight" in interchange

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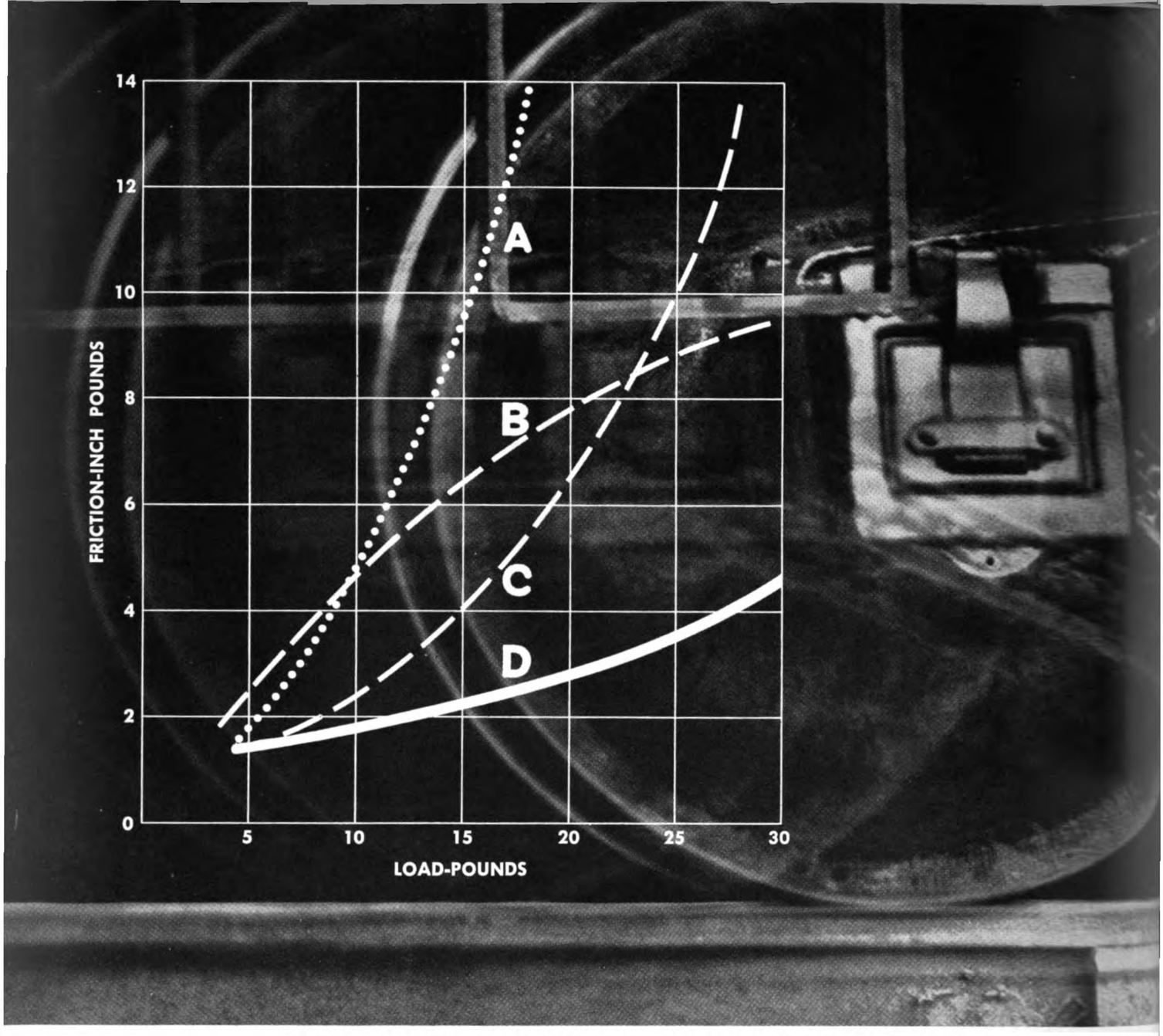
How Bangor & Aroostook Keeps Its Freight Cars Attractive . . . Page 15



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New Texaco Car Oil 1960 HD

cuts bearing friction at least 50%

Texaco Car Oil 1960 HD is a new product designed to lubricate even at those critical times when ordinary car oils don't give enough protection.

Rigid testing has proved the exceptional anti-friction characteristics and load-carrying capacity of this new Texaco lubricant. As curve "D" on the chart indicates, for example, a bearing lubricated with Texaco Car Oil 1960 HD offers only 3 inch-pounds of friction under a 20-lb. load—over 50% less than an identical bearing lubricated with the finest alternative product. In terms of actual service, this means lower bearing temperatures and fewer hotboxes.

Already drastically cutting hotbox rate on many railroads, Texaco Car Oil 1960 HD can do the same for your operation. Call your Texaco Railroad Lubrication Engineer for a complete report on Texaco Car Oil 1960 HD, or write:

The Texas Company, *Railway Sales Division,* 135 East 42nd Street, New York 17, N. Y.

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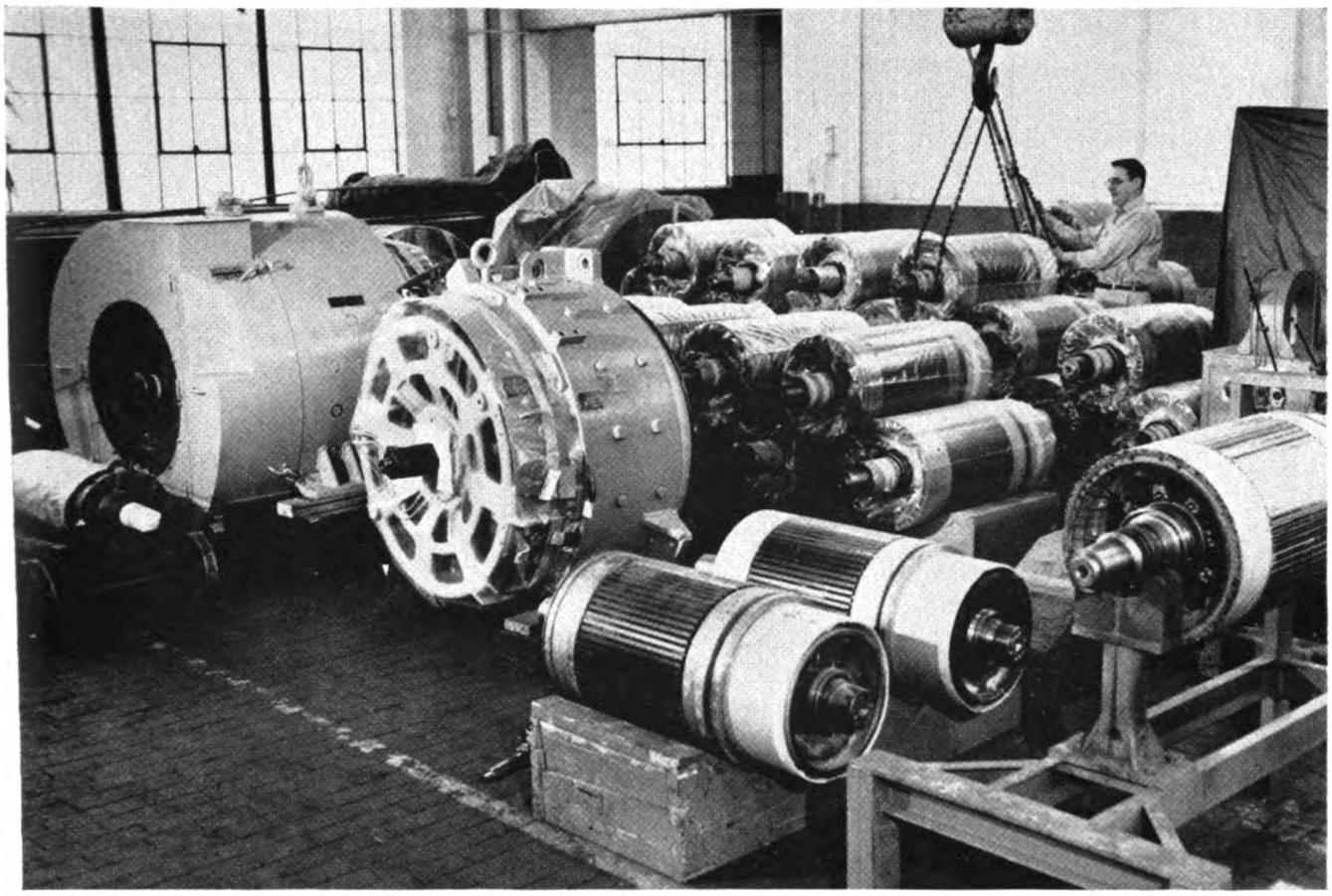
(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)



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COLUMBUS 16, OHIO, U. S. A. TRADE MARK

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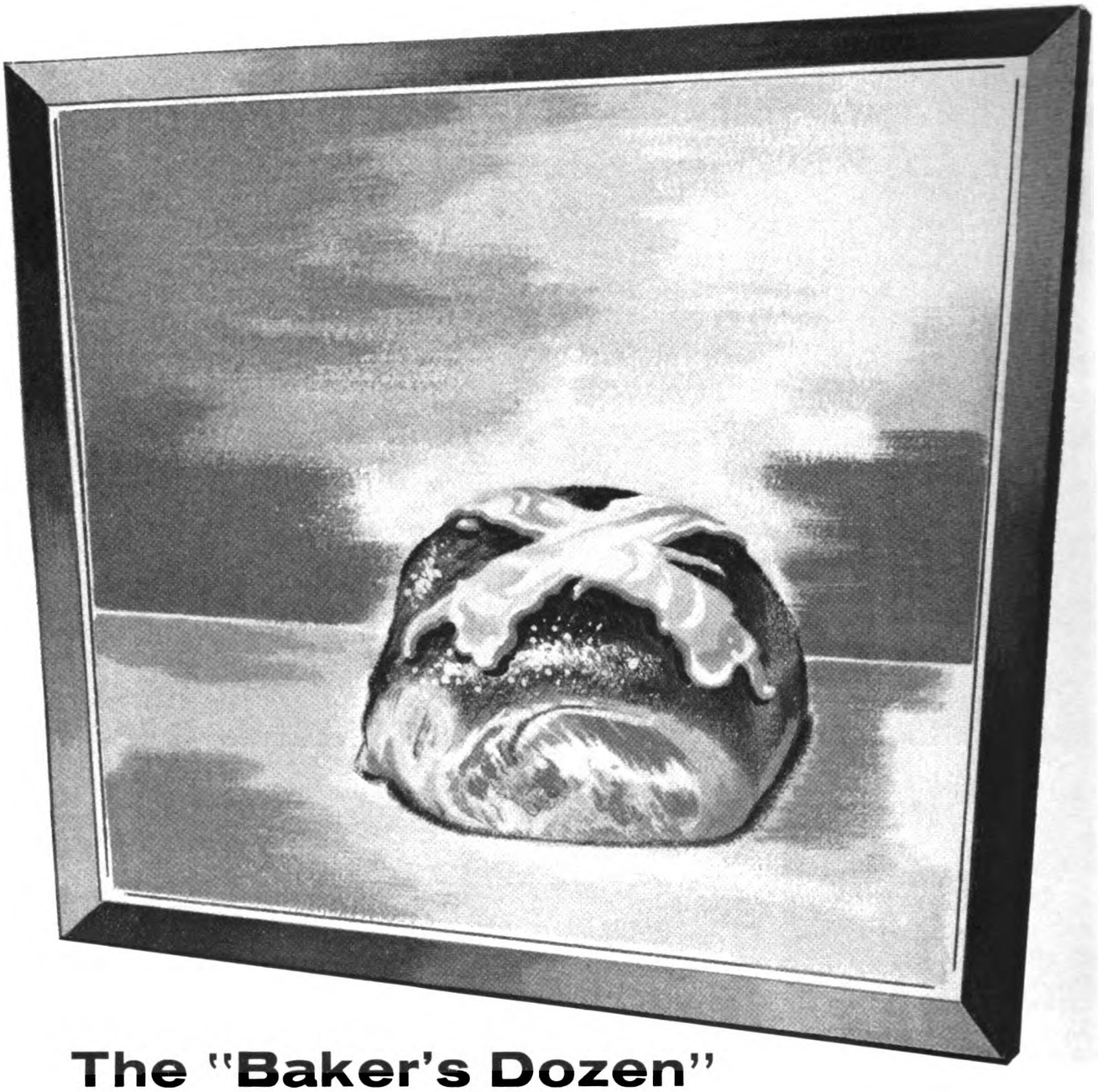

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Remember—'way back—to those less strenuous and more generous days when the baker gave you 13 sugar buns—and a smile—when you asked him for a dozen?

This happy practice hasn't died out completely. Many fine firms take very real satisfaction today in giving a baker's dozen in terms of product quality and company service—making it pleasant and profitable to deal with them.

When Adlake started a century ago the philosophy of the baker's dozen was the expected pattern of business. We like to think that we have remained old-fashioned in that one respect.

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Manufacturers of Adlake Specialties and Equipment for the Railroad Industry

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REPORT FOR JULY

Transport Act OK's Equipment Loan Guarantees

Government guarantees for loans to railroads enabling them to "finance or refinance the acquisition or construction of equipment or additions and betterments . . . for operating expenses, working capital, and interest on existing obligations" seemed assured in final passage of the Transportation Act of 1958. Other provisions include greater freedom in rate making and train service adjustments. Variations in House and Senate versions were reconciled in a joint conference committee. As originally introduced, the bills would guarantee up to $200,000,000 in loans for rolling stock.

Section of Brake Rigging Specification Changed

The AAR has advised certain changes in the section "Brake Rigging" on page 23 of the November 1956 issue of Specification No. 2518—Installation of AB Freight Car Brake Equipment. The items included under this heading with respect to requirements for brake rigging design on the basis of brake cylinder pressure of 100 psi will be held in abeyance and recert to the pressure requirement of 80 psi until further investigation can be made.

The 80-psi brake cylinder pressure represents a minimum standard for design purposes, however, it does not restrict any railroad or builder from using 100 psi if they prefer to do so.

New Haven Retiring Two Lightweight Trains

The New Haven is retiring two of its three lightweight trains—the 383-seat "Dan'l Webster" and the 467-seat "John Quincy Adams." The trains, after a little more than a year's experimental service, are going into yards to await better times.

The General Motors "Aerotrains" are also temporarily out of service at the EMD plant in La Grange, Ill.

Alternate Standard Lubricator Swab

A new design felt lubricator swab, part #0303, has been approved by the AAR as a correct substitution for the standard arrangement of the three metal rings and associated parts in the repair and maintenance of old style non-pressure heads of AB brake cylinders.

Before applying the swab, it must be soaked in oil, AAR Spec. M-906, and the surfaces of the swab cavity must be liberally coated with brake cylinder lubricant, AAR Spec. M-914.

The AAR advises that three manufacturers now have approved swabs and their names will be furnished on request.

Orders and Inquiries For New Equipment

Since the closing of the June issue, the *Atchison, Topeka & Santa Fe* has ordered 100 50-ft 6-in DF box cars from its Topeka shop. *Trailer Train Company* has ordered 200 50-ft piggyback flat cars from the Altoona shops of the Pennsylvania. Delivery is expected to begin in August. TTX is currently testing a tiedown stanchion developed by Pullman-Standard and applied to a Great Northern flat car. Meanwhile, some 85 50-ft cars now in TTX ownership are being equip-

(*Continued on page 10*)

TIME SAVING IDEAS IN THIS ISSUE

MOTIVE POWER AND CAR

Colorful Car Fleet Will Stay That Way 15
NYC Modifies Alco Temperature Control 20
Sante Fe Gets New Oil from Old 25
Timken Plant Can Produce 160,000 Bearings Yearly 26
What Happened at AAR Mechanical Division Meeting 27
Tooling Up (Mechanical Refrigeration 3) 33
Diesel Repair Time Savers 36

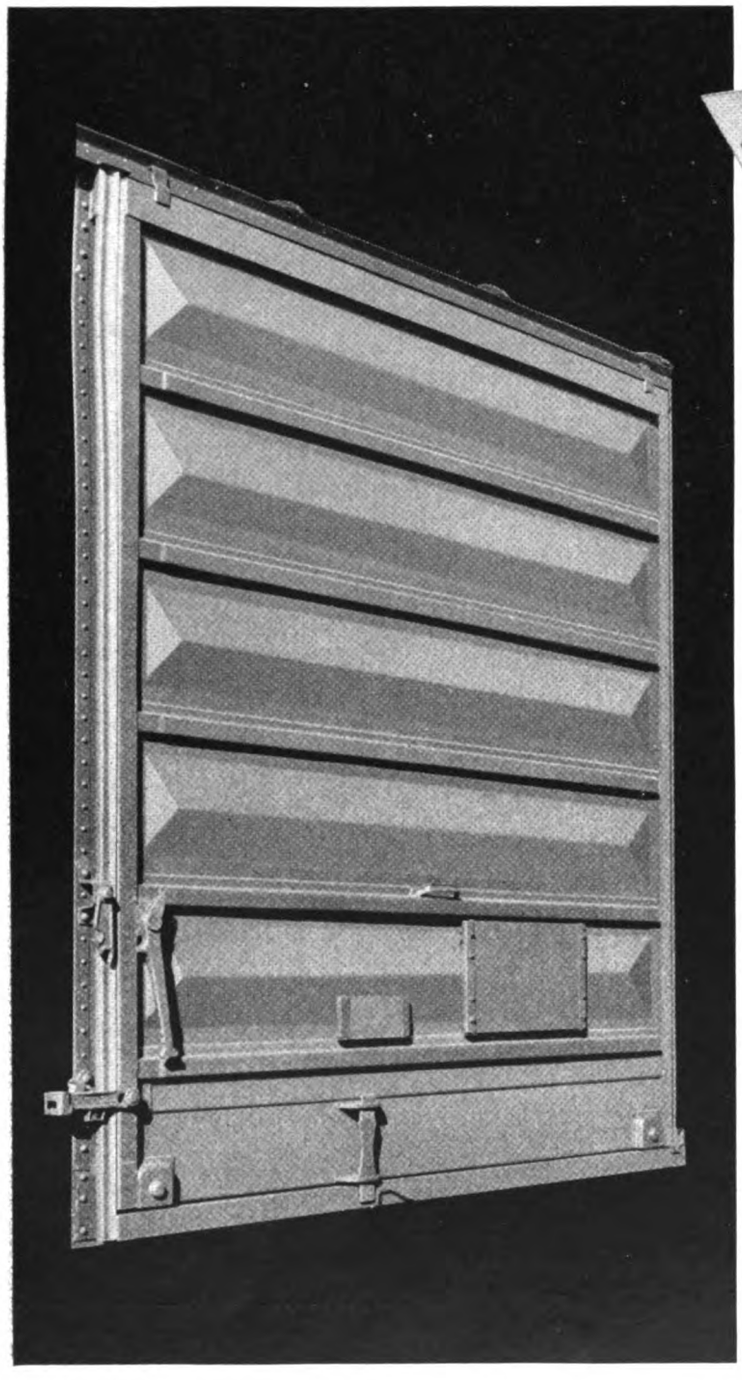
ELECTRICAL

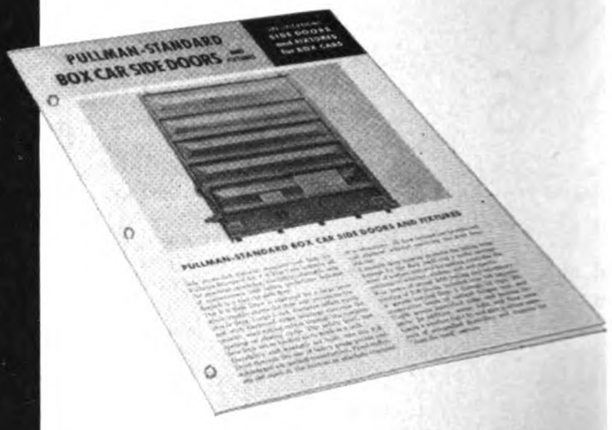
First Air-Conditioned Transit Car Fleet 38
Meter Boxes Aid B&O Load Tests 42
Extension Cord Ties Diesel To Its Load 44

DEPARTMENTS

What's New in Equipment 12
Personal Mention 10
Supply Trade Notes 10
Helps from Manufacturers 52

P-S Box Car Side Doors





This booklet will give you the facts ...write for it

Every pertinent fact regarding operating characteristics, strength and durability, maintenance ease and simplicity, lading protection qualities and laboratory and service testing of the P-S Box Car Side Door is included in this to-the-point booklet. Write for a copy now . . . study it . . . compare this door to any on the market. And when you do, no matter what comparisons you make—economy, durability, lading protection—you'll find the Pullman-Standard Box Car Side Door offers the best value to your railroad.

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CAR MANUFACTURING COMPANY

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Yellow Strand Braided Safety Slings

You're sure with Yellow Strand Braided Safety Slings on your equipment. These slings combine strength and flexibility to provide safety and ease of handling.

There's a Yellow Strand Sling designed to handle any load on your railroad from a highly polished crankshaft to a Diesel locomotive. Write us today and tell us the size, weight and nature of your problem lift. Our engineers will design a sling to exactly meet your needs! Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.

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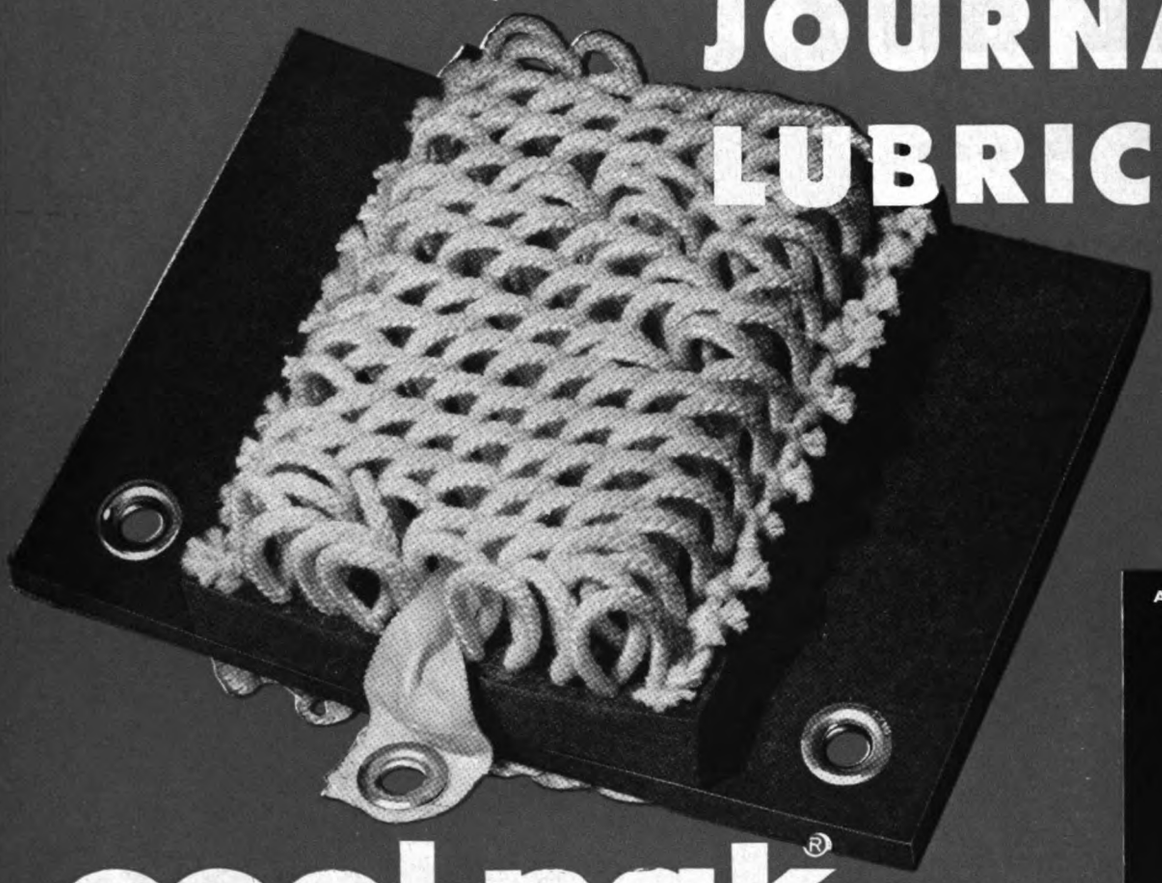

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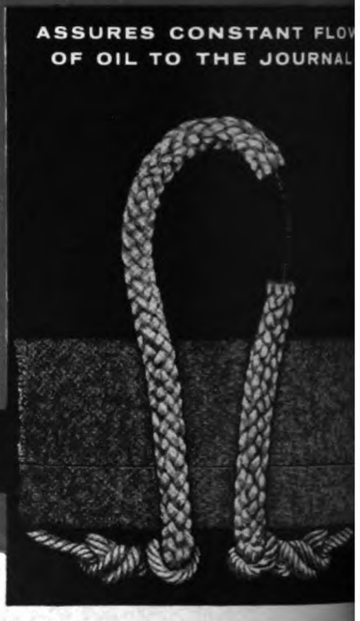
...WITH SUPER-RESILIENT, OIL-THIRSTY WICKS



Sectioned view with loop cut away to show stainless steel center core

forecasts new performance records ...lower cost per car per year!

Created after nearly three years of research and experimentation—Cool-Pak® is *a major breakthrough in journal lubrication.* Cool-Pak is all-new—in materials, design and construction. In fact, its construction is a complete departure from conventional lubricators—utilizing scientifically-designed resilient wicks for instantaneous oil delivery.

Cool-Pak has limited approval for test by the A.A.R. for interchange service. Road tests from Texas to Canada give promise of shattering all previous performance records in long life and dependable journal lubrication mile-after-mile, year-after-year, and in all kinds of weather.

NEW DIMENSIONAL STABILITY—Two layers of wool felt provide a superior oil reservoir. The felt has durability to withstand impact. And it acts as a filter so that only clean oil is transmitted. Oil-thirsty nylon, wool and cotton wicking cables threaded all the way through the oil-saturated layers and extending 2⅜ inches above the felt—drink up the oil and deliver it to the journal instantly and continuously.

CONSTANT JOURNAL CONTACT—The wicking cables are engineered and constructed to transmit oil over the entire length of the journal. Continuity is assured by the 21-strand, self-lubricating, stainless steel center core which holds the loops upright and provides a super-resilient, fast-recovery action insuring constant journal engagement and lubrication.

DEPENDABLE IN ALL KINDS OF WEATHER—The road tests from Texas to Canada have demonstrated that journal boxes with Cool-Pak lubricators run cooler in high temperature areas, and provide dependable lubrication in extremely cold climates. One test-report states that "Cool-Pak provides uniform pressure against the journal at all temperature extremes in the North American Continent."

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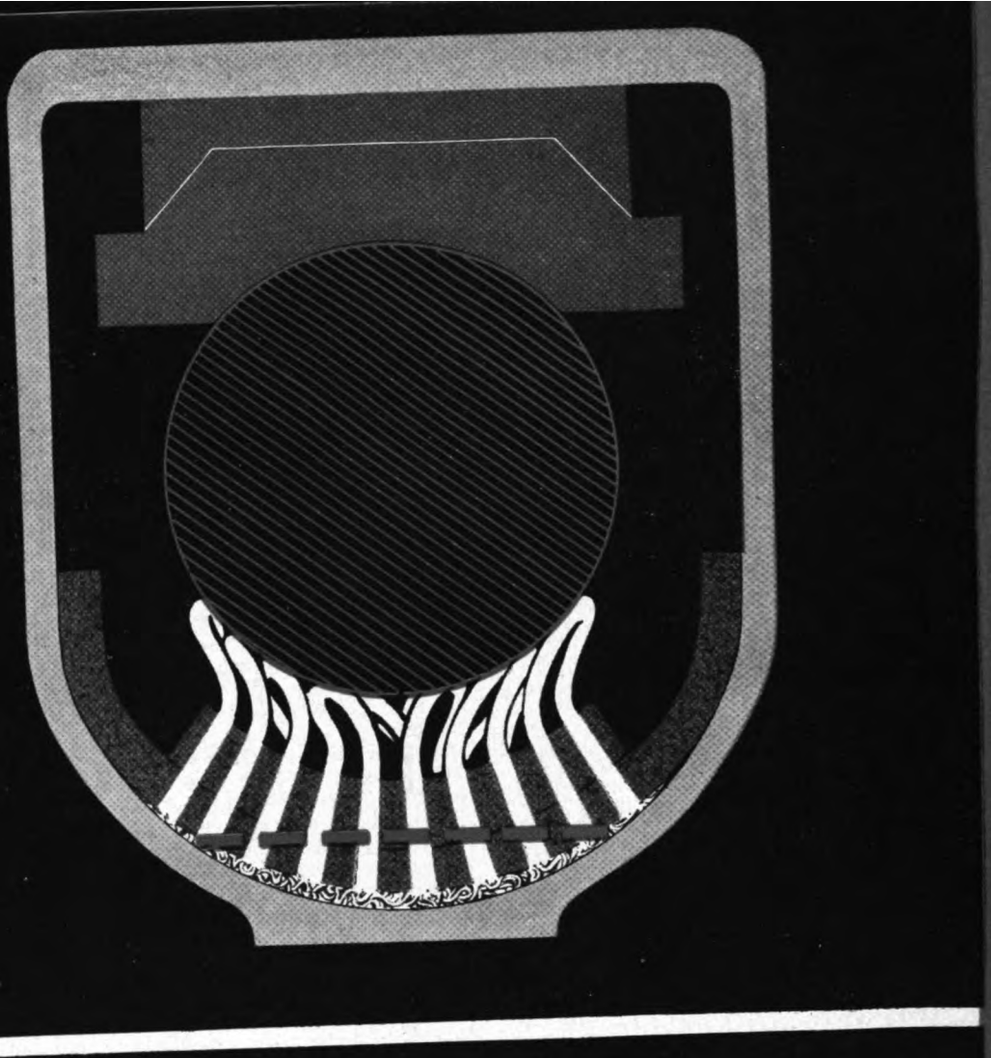

his end view of Cool-Pak in the ournal box shows how the ½" o 1" oil level assures oil satura- ion of both layers of felt, and he resilient, oil-thirsty wicks which are threaded through the elt and extend upward in rapid- vicking loops that maintain con- tant contact with the journal.

A cut-away view of Cool-Pak nstalled in a standard A.A.R. ournal box illustrates how the vicking loops provide efficient distribution of oil along the entire ength of the journal. Cool-Pak ontacts both collar and fillet ut avoids sharp edges of both — assuring superior engagement.

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ives complete engineering ta. Illustrates ease and pidity of Cool-Pak instal- tion and removal.

cool-pak®

A RADICALLY-NEW, THOROUGHLY-TESTED DESIGN FOR POSITIVE JOURNAL LUBRICATION

REPORT FOR JULY—*Continued from page 5*

ped with the ACF stanchion at Altoona. The *Western Pacific* has ordered four Airslide hopper cars at $12,700 each from General American for delivery during the third quarter of this year.

The Trane Company will provide complete refrigeration systems for the 25 dual purpose cars which Pacific Car & Foundry is building for the *Northern Pacific*, as reported in the May issue. The 10-ton Trane systems will hold temperatures anywhere from zero to 70 deg, permitting the cars to carry both frozen and perishable food commodities.

Miscellaneous Publications

SAFETY IN WELDING AND CUTTING. A complete revision of the AWS-ASA Z49 standard prepared for the protection of persons from injury and illness and the protection of property from damage by fire and other causes arising from welding and oxygen cutting equipment, its installation, operation and maintenance. Specific provisions included for gas weldng, shielded metal-arc welding, submerged arc welding, inter-gas metal-arc welding, brazing and resistance welding. *American Welding Society, 33 West 39th st., New York 18. Price, $2.*

MANUAL ON MEASUREMENT AND SAMPLING OF PETROLEUM AND PETROLEUM PRODUCTS. 172-page manual contains ASTM methods required to measure and compute amount of oil in storage and transportation tanks and for obtaining typical samples of tank contents. *American Society for Testing Materials, 1916 Race st., Philadelphia 3. Price, $3.50.*

"INSULATION ENGINEERING FUNDAMENTALS." 117-page book describes every phase of insulation from basic concepts, selection, application, construction and testing for large and small rotating machinery and electronic equipment. Contains also a glossary of insulation words and phrases. *Westinghouse Electric Corporation, Box 2278, Pittsburgh. Price, $2.75.*

Personal Mention

Atlantic Coast Line—*Florence, S. C.:* A. L. WATERS appointed diesel foreman; T. S. CROMER, assistant diesel foreman, and J. T. SCHORB, foreman. *Waycross, Ga.:* G. F. MOURO, JR., appointed assistant enginehouse foreman; L. A. SPENCER, general mechanical inspector, and A. L. RINEHART, assistant erecting foreman. *Sanford, Fla.:* M. E. SMITH appointed road foreman of engines. *Ocala, Fla.*: H. V. NELSON, JR., appointed road foreman of engines.

Boston & Maine.—*Boston:* CLARENCE W MCELROY, assistant master mechanic, appointed master mechanic, succeeding EVERETT H. BURNEY, retired.

Canadian National.—*Montreal:* G. M. HARDING appointed superintendent of training (mechanical), succeeding L. H. BEXON, retired. W. H. CYR, research engineer, succeeds Mr. Harding as chief mechanical engineer.

Chesapeake & Ohio.—*Richmond, Va.:* S. M. EHRMAN appointed assistant general superintendent car department, succeeding B. J. RUCKER, retired. E. J. HENSHAW succeeds Mr. Ehrman as assistant to general superintendent car department. *Walbridge, Ohio:* J. D. SCHLINK, general foreman, assumes jurisdiction over both locomotive and car departments. Position of general foreman car department held by Mr. Henshaw abolished.

Duluth, Winnipeg & Pacific:—*West Duluth, Min.:* A. J. MYRE, assistant car foreman, appointed car foreman.

Florida East Coast.—*S. Augustine, Fla.:* GORDIE STEWART appointed assistant chief operating officer. E. H. SCHOEDINGER appointed assistant chief mechanical officer, succeeding Mr. Stewart. *Buena Vista, Fla.:* JOHN SIMS, assistant master mechanic, appointed master mechanic, succeeding Mr. Schoedinger.

Illinois Central.—*Centralia, Ill.:* R. D. ELLIS appointed master mechanic, succeeding J. M. JEFFREY, retired.

Minnesota Transfer.—*St. Paul Minn.:* LARRY E. MARTIN, road foreman of engines, appointed master mechanic, succeeding ROBERT D. MARK, retired.

Nevada Northern.—*East Ely, Nev.:* A. P. CAHILL appointed master mechanic, succeeding G. F. LAKE, retired.

New York Central.—*New York:* R. T. TOMLINSON temporarily appointed lubrication engineer. J. M. LOGAN appointed supervisor sleeping-car maintenance.

Norfolk & Western. —*Columbus, Ohio:* E. C. CROWDER, JR., appointed general foreman, succeeding E. W. MEREDITH, retired. *Williamson, W. Va.:* A. L. WOOTEN appointed day roundhouse foreman , succeeding Mr. Crowder. Mr Wooten formerly roundhouse foreman at Columbus.

St. Louis Southwestern.—*Commerce, Tex.:* D. T. HOPKINS, assistant road foreman of engines, appointed road foreman of engines.

Southern. *Richmond, Va.:* W. B. COOK appointed general foreman.

Supply Trade Notes

John W. Scallan

James B. Sa

PULLMAN-STANDARD CAR MA FACTURING COMPANY. — *John Scallan* elected president, succeeding C *W. Bryan, Jr.*, retired.

Mr. Scallan, a graduate of Notre D (1925), worked one year on a Chicago n paper, then joined the Pullman Com Two years later entered sales departme Pullman-Standard. Became vice-presi sales, and in January 1953 vice-presider general manager.

Headquarters of Pullman-Standard no 200 South Michigan avenue, Chicago 4

■

GENERAL STEEL CASTINGS CORPO TION.—*W. Ashley Gray, Jr.*, and *Law P. White* appointed managers of western eastern sales of railroad products and dustrial castings at Granite City, and Fo stone, respectively.

■

JOHN A ROEBLING'S SONS CORPO TION.—*Earl A. Frazier* appointed Sa district sales manager, and *John P. K* New York district manager, Wire Rope Aircord Division, succeedng Mr. Frazier. Kadlic formerly in charge of wire rope s Philadelphia district.

■

SPECTROCHEMICAL LABORATORIE INC.—Operations moved to new he quarters at 8359 Frankstown avenue, Pi burgh 21.

■

ROLIN CORPORATION. — Chicago o moved to Inland Steel Building, 30 W. Mo roe street, Chicago 3.

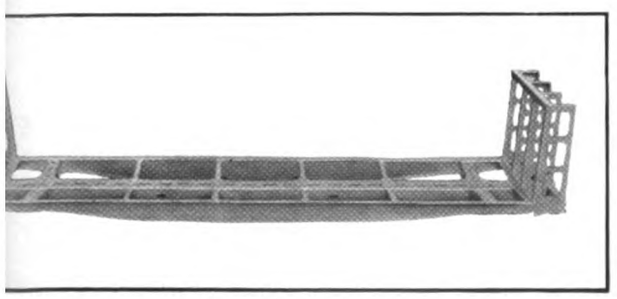
■

KW BATTERY COMPANY.—A Co nated Products Division established to s serve the demand for allied product cluding battery chargers.

(*Turn to page 48*)

Where railroad progress is cast in steel.....

rly 5000 pulpwood cars equipped with Commonwealth t steel underframes and upright ends are in service major railroads. Designs are available for ton and 70-ton capacity cars.



mmonwealth cast steel underframe and interlocking right ends simplify pulpwood car construction; provide eater strength, permit easier loading, maximum capacity.

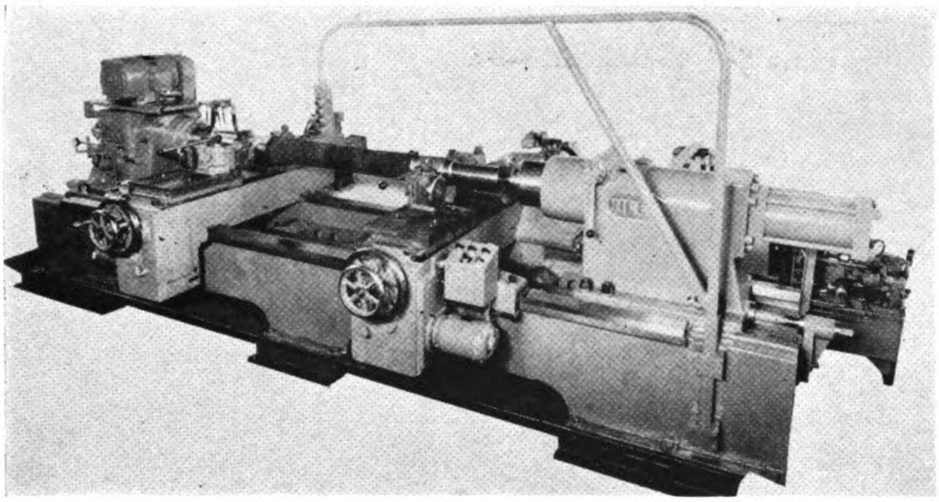
More than 50 years ago, General Steel recognized the railroad industry need for steel castings . . . larger and more complex than ever before conceived.

Advanced engineering and production techniques developed through its pioneering have made General Steel a unique supplier to today's railroads. Its Commonwealth one-piece products . . . for freight cars, passenger cars and locomotives . . . utilize cast steel's great strength at minimum weight, exceptional ruggedness and freedom from maintenance to cut operating expenses for users throughout the world.

Plan wisely for the future . . . invest in Commonwealth products.

ENERAL STEEL CASTINGS

GEARED TO PROGRESS



Axle Journal Lathe

This axle journal lathe is a double-carriage, single-end drive type which can be supplied as a straight axle lathe that also can provide contour profiling, or as a journal lathe that also can be used as an axle lathe. The lathe can machine car wheel sets and unmounted axles, diesel locomotive wheel sets with drive gear attached, and unmounted diesel axles.

On mounted wheel sets, it will turn and burnish end collars, journals, and dust guard seats. For axles, the wheel seats can also be turned and burnished.

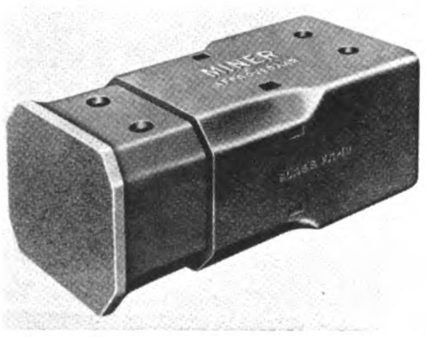
This lathe has independently controlled electronic feeds, hydraulically actuated quill, hydraulic pressure opposed burnishing, single-end drive and four selections of speed range. Independently controlled feeds permit returning the carriage immediately at completion of one job to make a fast start on a new job. Hydraulic quill actuation provides fast operation and fewer moving parts than screw actuation of the entire tailstock. This lathe's tailstock does not travel. Only the quill travels. This reduces wear and eliminates poor adjustment which occurs after extensive operation of conventicnal designs. Hydra pressure forces the wheel sets agains collapsible spring-loaded center on the h stock. When the center collapses, the locks against the serrated-face driver pla

Use of a single-end drive eliminates problems of synchronizing two drives wear on the work piece by eliminating twist created by two drives and elimin the possibility of chatter in the work p Four spindle speed options are available straight carbides or for high-speed steel and burnishing: 200 rpm with constant-s a-c motor, 100 to 200 rpm with adjusta speed d-c motor, 100 and 200 rpm with speed a-c motor, and 50 to 200 rpm w variable-speed d-c motor. The headstock dr consists of a V-belt directly driving a w gear.

The two carriages, each with hand feed for turning and power cross-hydra pressure for burnishing plus hand and po longitudinal feed and rapid traverse. driven by pinion drive at the center of bed.

Extra equipment includes coolant syst tool holder for high-speed form tools, cam plates for two special axle sizes, and set stellite burnishing rolls. An automatic loa device is available for pit-mounted lathes.

The lathe bed length is 18 ft; center he from floor line, 46 in., and bed width, 4 Swing is 45 in. and accommodates maxim wheel diameter of 42 in. *Machine and F road Tools Dept., Hamilton Div., Bal Lima-Hamilton Corp., Dept. RLC, Ham Ohio.*



Rubber Draft Gear

The Class FR-19 Rubber Draft Gear provides an improved arrangement which permits the use of more rubber units than used in previously certified Miner gears. Increased capacity results. Ultimate pressures have been maintained at a low level. Proper initial compression provides slack-free operation of cars with positive and full-time protection for lading, cars and attachments.

The FR-19 gear is fully enclosed and held as a self-contained unit, without bolts, by a special locking feature. To permit easy application to the draft gear pocket, inserts are placed in the locking arrangement during gear assembly to reduce the length of the gear prior to shipment.

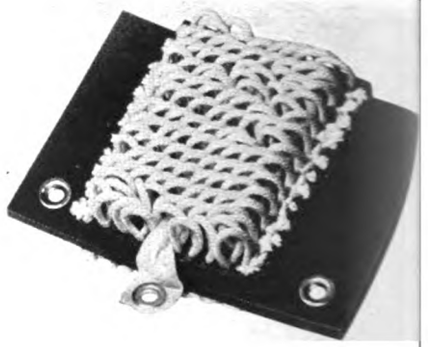
The gear is 24⅝ in. long and, therefore, no follower plates are necessary for application to the car. The FR-19 gear has AAR approved. *W. H. Miner, Inc., Dept. RLC, Chicago.*

Dye Penetrant Inspection Materials

Spotcheck dye penetrant inspection materials made from chlorinated hydrocarbons are now available in non-flammable or very-high flash-point formulas in either pressure-spray cans or bulk. The spray can provides a convenient dye inspection method for locating cracks, seams, porosity and other defects open to the surface in almost any solid material.

According to the manufacturer, the materials are non toxic. However, their use in reasonably ventilated areas is advised. The formulas are available in 12-oz pressure-spray cans, and quart, gallon and 5-gal cans, and 55-gal drums.

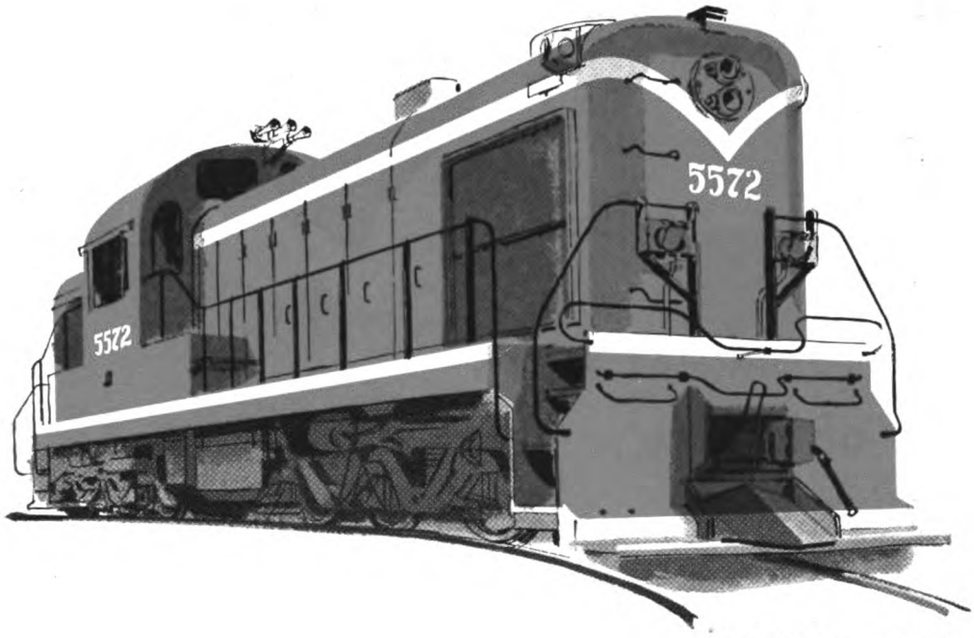
Spotcheck penetrant and developer are now available in new water-wash formulas for quick and thorough removal by water spray. *Magnaflux Corporation, Dept. RLC, 7300 West Lawrence ave., Chicago 31.*



Journal Lubricator

The Cool-Pak lubricator, a departure f previous models, is based on a "revol wicks" principle which is said to keep wick surfaces in contact with the journal thro out the minus 60 to 130 deg F temperat range. Cool-Pak is composed of a two-l felt base 2 in. thick and a series of 1 180 wick, depending on lubricator size. In center of each wick is a 21-filament stra stainless-steel wire. By spring action, th lubricating wires hold the wicks against

(*Continued on page 54*)



SHORT RUN... OR LONG HAUL

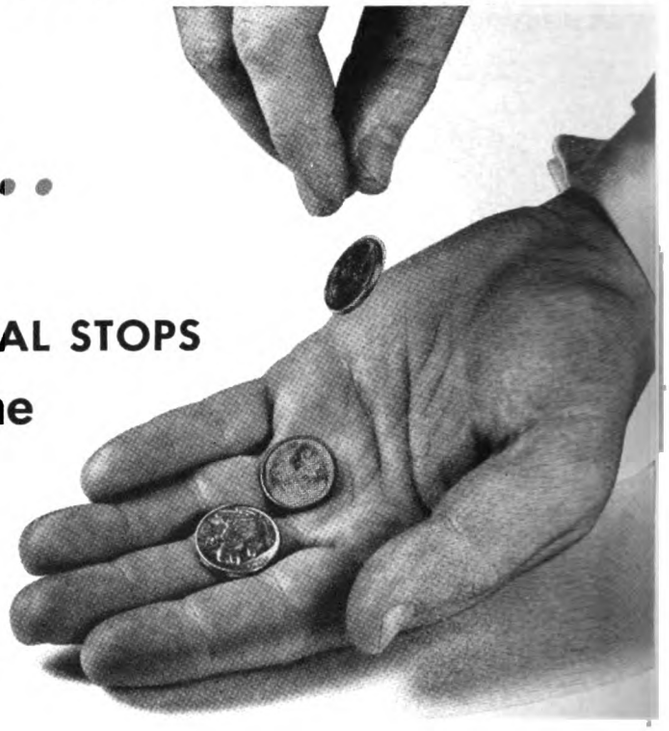
You'll always get top performance from your diesels when you use Esso Diesel Fuel. Many years of experience backed by laboratory and on-the-road testing have combined to produce high quality Esso Diesel Fuels for every type of railroad requirement—for switching, heavy duty passenger and freight diesel locomotives...for diesel-powered maintenance of way machinery...for roadbed construction equipment. With outstanding distribution of bulk storage throughout the Esso area, the right grade is always available to fill your specific needs. For the full story on dependable, high-quality Esso Diesel Fuels or the complete line of Esso Railroad Products, call your local Esso office, or write: Esso Standard Oil Co., Railroad Sales Division, 15 West 51st St., New York 19, N. Y.

ESSO DIESEL FUEL

ESSO RESEARCH works wonders with oil **Esso** **RAILROAD PRODUCTS**

HOW SOLID BEARINGS AND JOURNAL STOPS HELP KEEP RAILROADS OUT OF THE RED

It's a fact...



that MAGNUS R-S JOURNAL STOPS can cut the cost of routine bearing inspection to less than 7 cents per car per day

With this and other cost reductions, Journal Stops can save you about $35 a year on every freight car!

PACKING seldom needs adjustment when R-S Journal Stops are applied. That's why they can cut car oiler's time in half, reduce annual journal-box servicing costs to $24.11—only 6.6 cents per day.

But that's not all. When you stabilize the solid bearing assembly with R-S Journal Stops, practically all other bearing operating costs are reduced too. In fact railroads using Journal Stops report total savings of about $35 a year on each car.

Journal Stops prevent displacement of bearing and wedge under impact and braking forces —help provide uniform, uninterrupted oil film lubrication, give the solid bearing a chance to work at optimum efficiency *all the time.* They double bearing life, reduce wheel flange wear, prevent dust guard damage, cut truck maintenance all along the line.

Today there are more than 7,000 freight cars equipped with R-S Journal Stops. In service, they have increased hot box mileage 10 times—cut hot box costs to a tenth of current costs on similar cars in similar service. That means less than ⅓ cent per car per day to cover all costs associated with bearing road failures.*

Yes—this is the low-cost solution to the hot-box problem. A solution that retains all the inherent advantages of standard AAR solid journal bearings. For *all* the facts, write to Magnus Metal Corporation, 111 Broadway, New York 6, N.Y., or 80 E. Jackson Blvd., Chicago 4.

**Cost based on data compiled by the Mechanical Division of the Association of American Railroads in 1955.*

MAGNUS

Solid Bearings

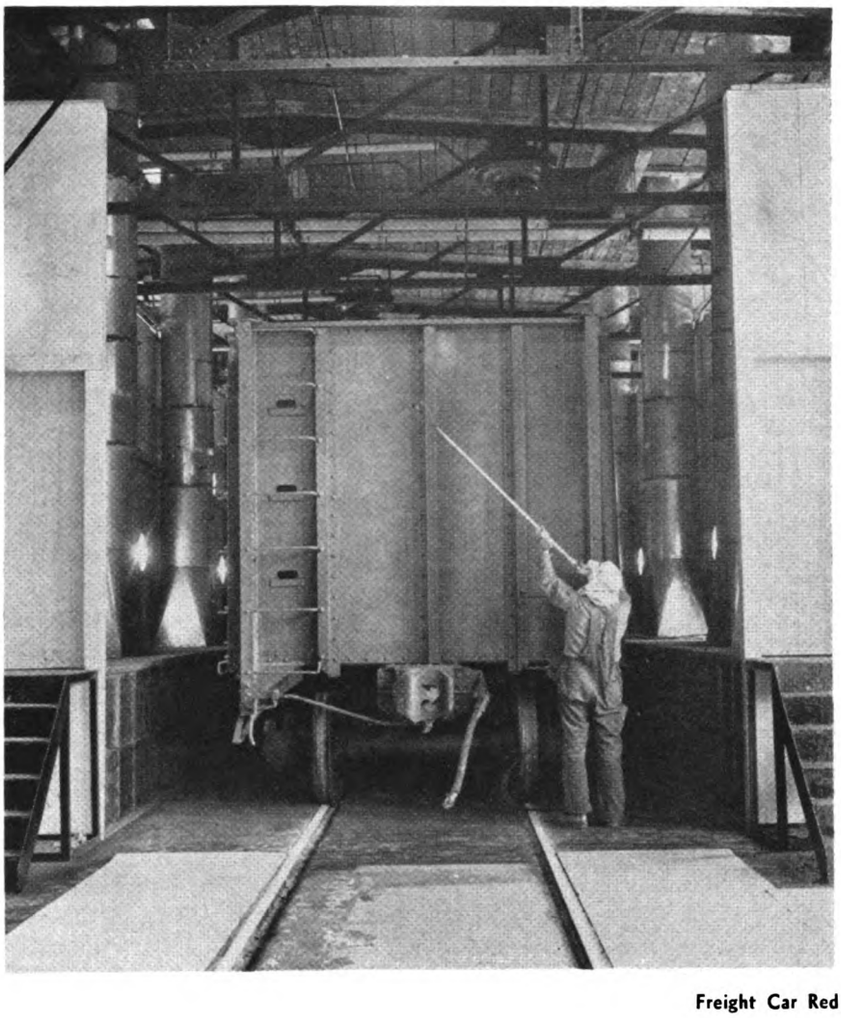
Right for Railroads
...in performance...in cost

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**

Blue-White-Red

Bright Red

Reefer Yellow



Freight Car Red

Colorful Car Fleet Will Stay That Way

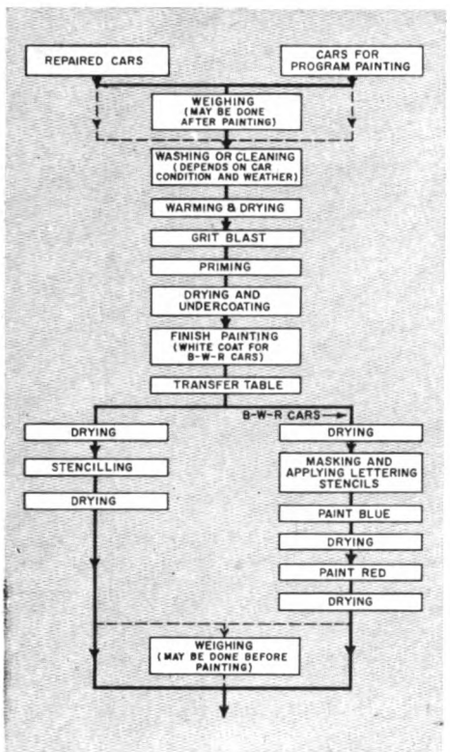
Bangor & Aroostook has a production line for its freight car painting

THE BANGOR & AROOSTOOK'S 4,677 freight cars probably present more diversified painting problems than the car fleets of most larger railroads. BAR management is convinced of the advertising potential of its freight cars. Most distinctive and best known by railroaders everywhere are the 1,350 blue-white-red box cars with their "State of Maine Products" legend.

But, that's not all. Actually the railroad has five different basic paint schemes. There are the blue-white-red cars (regular and insulated boxes). The road has 1,390 yellow refrigerator cars. Approximately this same number of cars are painted standard freight-car red (box, gondola, flat and pulpwood cars). Bangor & Aroostook owns 199 black-hoppers. And finally, the road has just begun the repainting of approximately 200 of the blue-white-red box cars with a bright new all-red paint arrangement.

Because management is so interested in the appearance of its cars, the mechanical department is confronted with the problems of putting an automobile-quality finish on them. It is realized that such a finish—in fact, any paint—does not last indefinitely. Without cleaning, brightly colored cars soon loose their value as rolling advertisements. Two things are done. Freight cars are washed

Production Line Painting . . .



Bangor & Aroostook has successfully integrated custom blue-white-red painting with more conventional solid-color arrangements on its production line.

ON OUR COVER

Most elaborate freight-car painting done by Bangor & Aroostook is that of its distinctive blue-white-red "State of Maine Products" cars. In lower view, stencils and masking are being applied over dried white enamel prior to application of blue and red. At the top are the same cars being washed at Northern Maine Junction.

regularly at Northern Maine Junction; and the BAR has always authorized regular painting programs for all types of equipment.

Recently, the road took the biggest step yet in its "good looks" campaign. Since late in 1957, the Bangor & Aroostook has been operating a $300,000 production-line paint installation at its Derby, Me., shop. Along with being the most important link in keeping the car fleet attractive, the new paint shop will keep refinishing costs down, and will lengthen both the life of the paint on the cars and the service lives of the cars.

The road has been operating on a six- to seven-year painting cycle. With its present ownership of 4,677 revenue cars, it necessitates the repainting of over 600 cars per year. This painting load is further increased by the necessary refinishing of cabooses and other non-revenue equipment.

The 600 cars-per-year painting goal requires the refinishing of three cars per day, and that is the typical output of this new shop. At the same time, facilities are available to step this up to a four-per-day rate.

Complete Protection

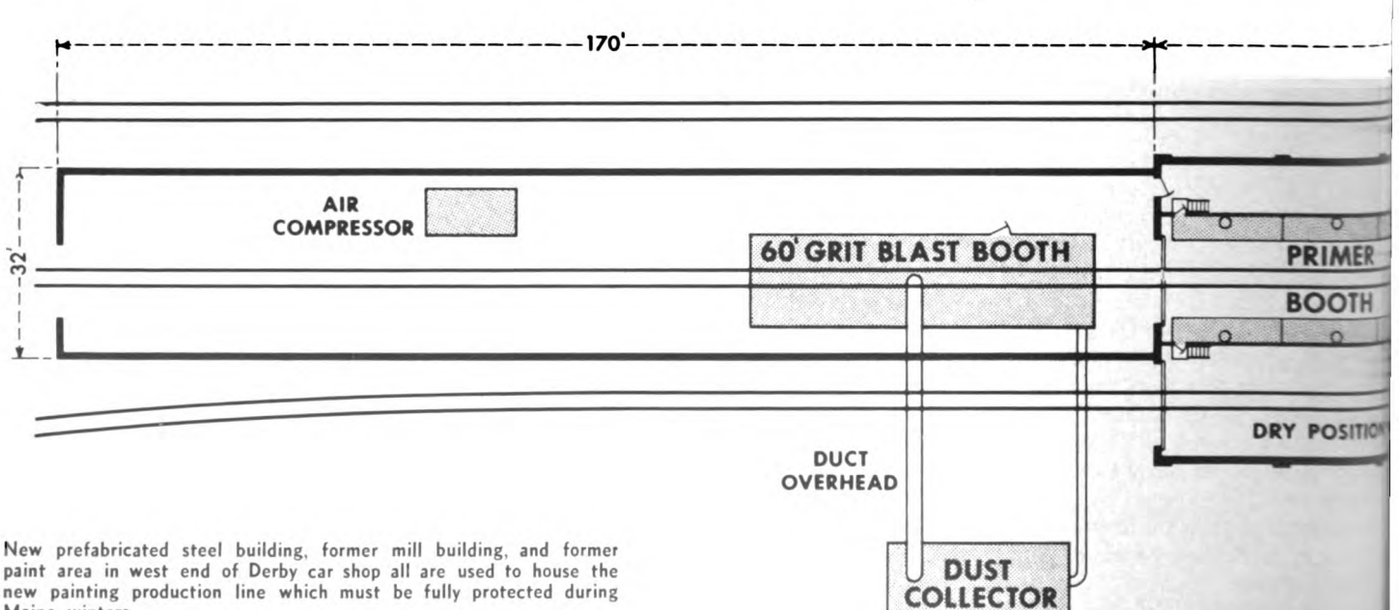
Weather in northern Maine prevents any outdoor painting for about six months of the year, and low temperatures make not only protection, but heat essential for any type of successful painting. When the BAR painted cars outdoors, at least 20 per cent of the working days were lost because of rain. When it came to setting up the paint production line, the existing paint shop and the former mill building were used. At the south end of the mill building, a 190-ft prefabricated steel building was erected to provide space for washing and drying

Grit blast was located in new prefab bui which is long enough to hold two cars for wash and warming. New compressor supplements supply; insure air volume for painting.

cars, and to hold the Pangborn blast cleaning room which was inst The mill building was extended ap mately 10 ft, and with the new pre building, a 360-ft length of protec and heated track space is available

Two cars can be accommodate the drying area at the beginning o line. Accumulations of ice and sno of dirt, can be washed down with s and hot water. The earth floor o area is adequately drained. Seven T low-pressure-steam unit heaters can ply over 900,000 Btu/hr and two-t of this was calculated to be use drying and warming cars for pain A car spends a minimum of 4 hr

The Pangborn Type MS blast cl ing room is fitted entirely within prefab building. It is expected tha



New prefabricated steel building, former mill building, and former paint area in west end of Derby car shop all are used to house the new painting production line which must be fully protected during Maine winters.

DUE

AR 2 1959

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s shrouded has just
n booth. This is the
AR's distinctive paint

paration made pos-
ient will extend the
y two years for al
iow, the blue-white-
repainted after six
cted to go to eight.
ment has been on a
g cycle, and this is
nine. The plant is
cars go immediately
to the priming booth.
he thoroughly cleaned surfaces should
ave no time to rust after blasting. Two
ien shot-clean three cars daily, and do
ecessary washing prior to that. Actual
me in the booth is about one hour.
ormerly disc sanders were used and
iey were slow and incapable of remov-
ig all the rust.

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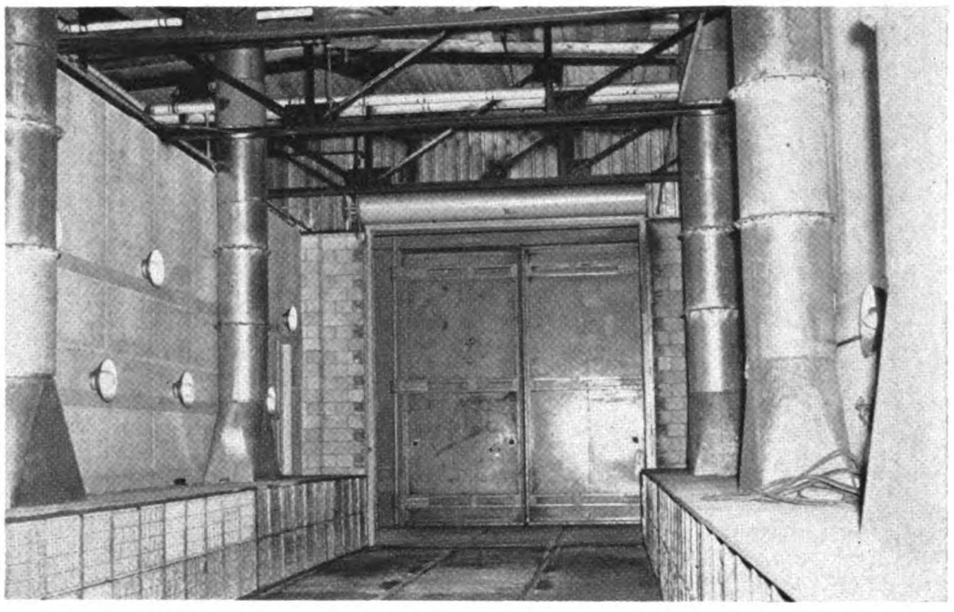
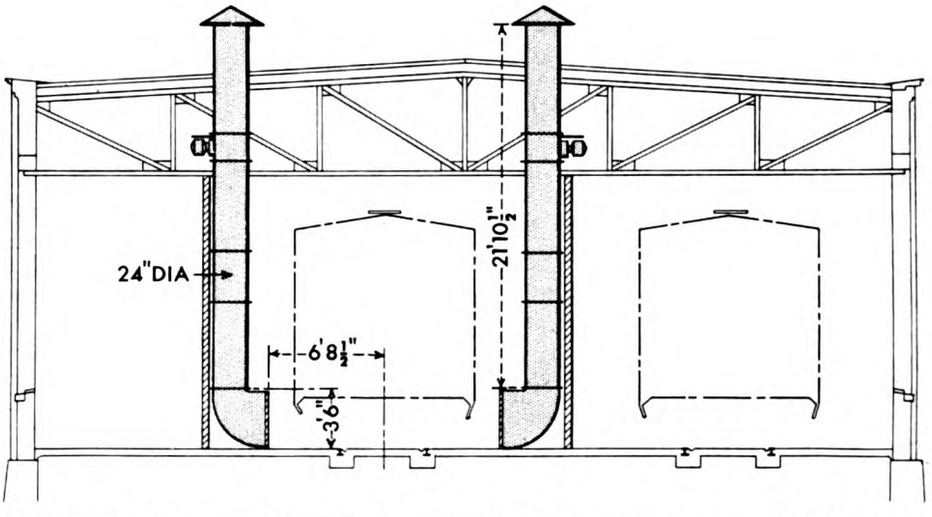
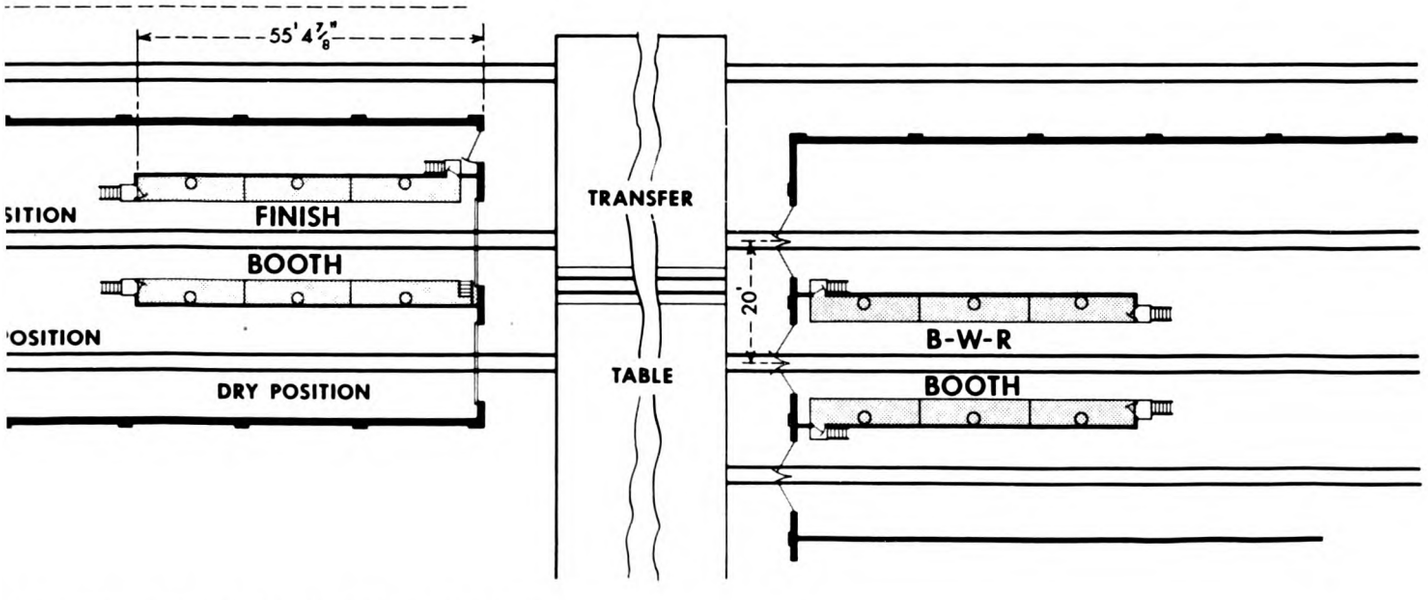
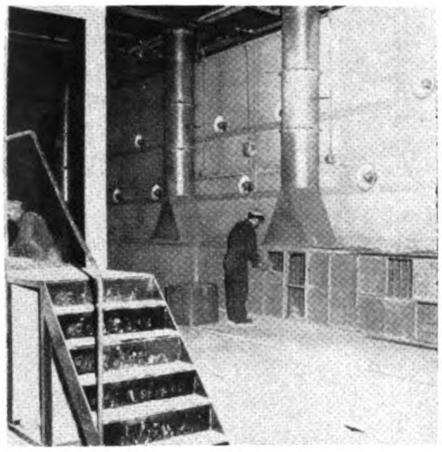


Railroad-designed paint booth where priming is performed is adjacent to blast booth, doors of which are in the background. This booth is in the former mill building and is similar in construction to the two finish coat booths. Tops of plenum chambers form car-floor-height work platform in booths.

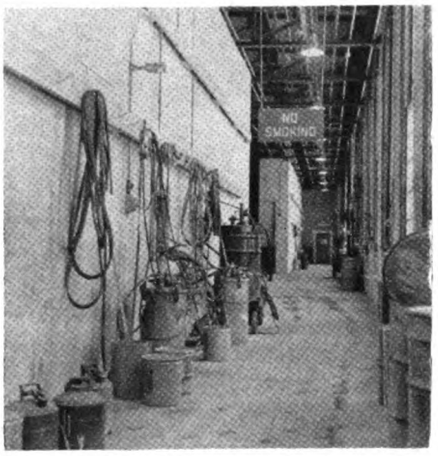


Six 10,280 cfm fans and separate exhaust ducts in booth produce a modified down-draft discharge which gives an air velocity of about 150 fpm down the car sides.





Paint arrestors are readily changed from plenum chamber filter frames. Individually controlled exhaust duct fans are turned on and off by painter as he goes around the car.



Separate Spee-Flo paint heaters for the individual colors are kept outside booths. Hoses go through opening in booth wall. BAR buys and uses paint from 5-gal containers.

Car moving on the production line is handled small Trackmobile which formerly did all switching. Now it spends most of its time sp ting cars for cleaning and painting.

The BAR gave consideration to traveling paint spray booths and discarded the idea because of restricted overhead clearances and because the variety of colors would complicate the operation. What have been built instead, are transite-walled, car-length booths with a modified down-draft exhaust system using forced filtration to remove overspray. Car-floor height platforms run the length of the car on each side, and it is from these that painters work. All painting is hand spray, using six-ft Eclipse guns. Paint is supplied from Spee-Flo spray units.

The BAR uses a fast-dry, zinc chromate primer and it is applied by a painter who makes one trip around the car putting on a mist coat, and then a second trip for a heavier coat. The aim is to apply a 2.5 mil thickness of primer, and this is a cold spray operation. Box car priming requires about 1.5 man-hours.

Between the two booths in the former mill building is a car-length area where underframes can be painted while the primer is drying. The car then moves into the finish booth. Here there is a 2 mil thick, hot-spray application of one coat of quick-drying synthetic enamel. This is the final coat for all cars except the blue-white-red boxes. For them, th basic white enamel coat is applied to each entire car side.

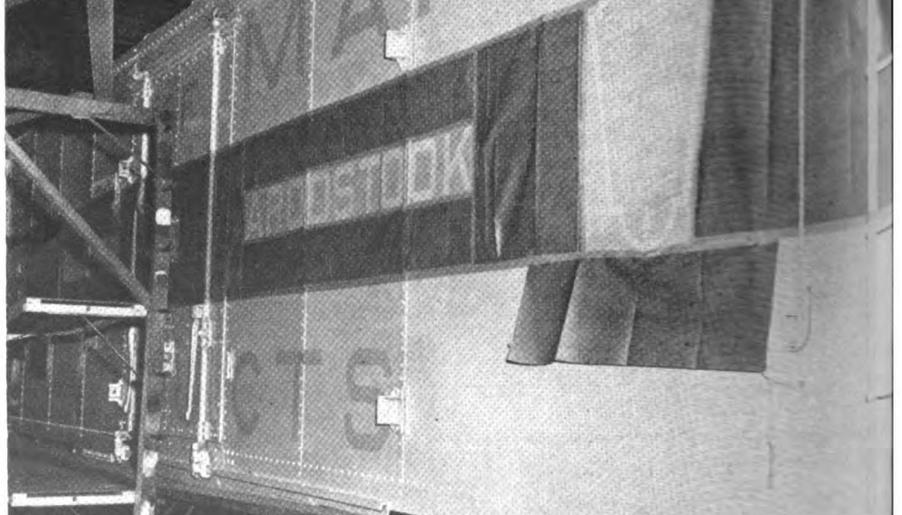
The enamels used by the BAR dry in approximately four hours. Roofs are painted, if inspection finds this necessary. For simplification, the BAR has recently been painting the ends of refrigerator cars with the same yellow used on the sides. For standard box cars, the application of the finish coat requires about two man-hours.

The exhaust systems in these booths are capable of moving 26,000 cfm. In addition to the regular unit heaters in the mill building, there are two wall-mounted, high-pressure steam heaters mounted in wall openings and interlocked with exhaust fans to make up heat losses during painting. Lighting is arranged to give an intensity of 50 footcandles on working surfaces in the blasting, painting, and stenciling positions.

White, Red and Blue

Application of the red and blue finish coats to the b-w-r cars is done in a third duplicate booth in the old paint shop across the transfer table. There is track space for drying and for the application of necessary lettering stencils and masking on these b-w-r cars. First the red, and then the blue finish coats are sprayed on. Car movements on the entire production line are handled with a

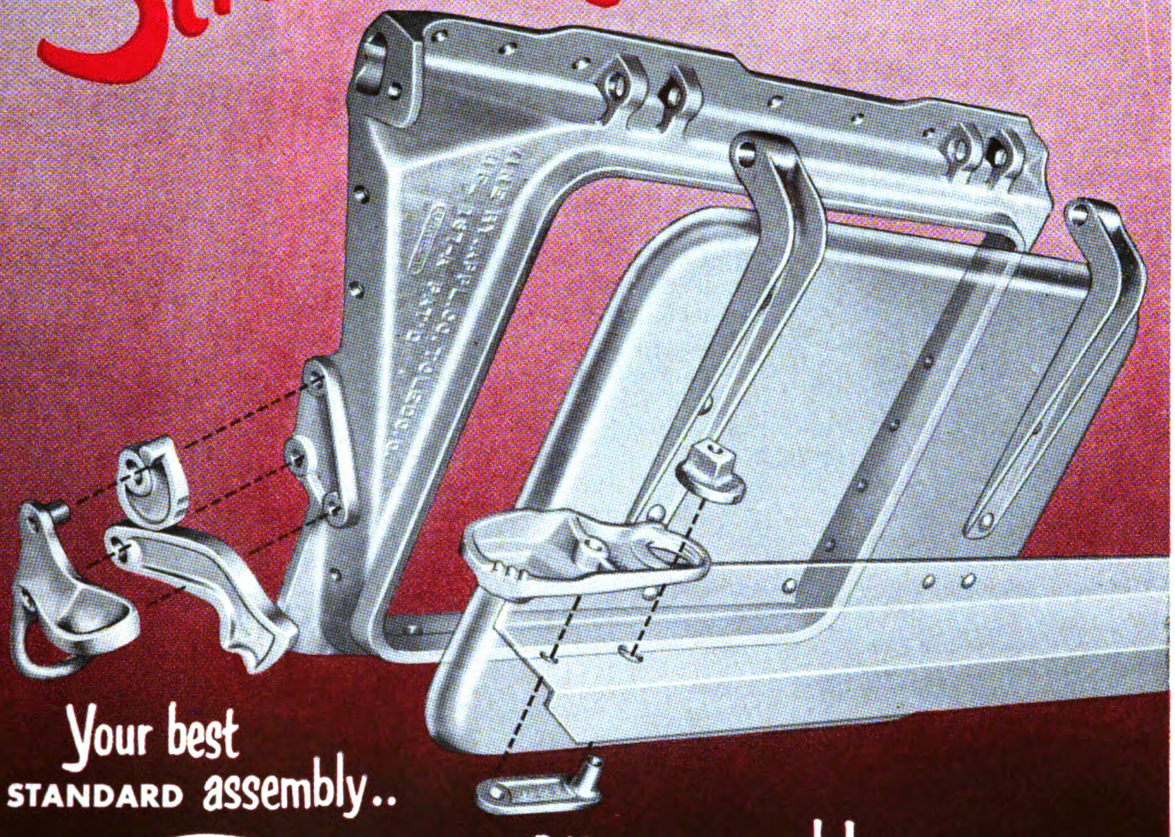
Stencilling position in shop has scaffolds to facil tate work. Cleaning vats and racks are conveni ently located. Drying position in background h banks of infra-red lamps. Several types of ca may be on the paint line at one time.



Scaffolds and stencil racks at proper levels have simplified the preparation of the b-w-r cars for their fi paint coats. With Demp Nock stencils, masking tape and paper masking applied, this car is ready for th final two coats of paint.

CORRELATED UNITS MAKE HOPPERS

Structurally sound..



Your best STANDARD assembly..

WINE

All cast steel!

Hopper Frames, Adjustable Locks and Hinges

THE WINE RAILWAY APPLIANCE CO., TOLEDO 9, OHIO

small Whiting Trackmobile. A newer, larger unit does the switching outside the shop.

Cars not requiring the second and third finish colors double back from the transfer table and are dried and stenciled. The BAR has tried spraying its lettering and emblems, but has returned to brushes to insure a quality job. Stenciling requires 2.5 to 3.0 man-hours for a standard box car.

The present three-per-day output usually requires six men on this paint production line. Two do the grit blasting and necessary preliminary washing and cleaning. One man handles the priming and occasionally assists another painter who works full time on stenciling. The prime coat painter spends at least three hours daily at duties other than those on the production line. One man handles the finish painting (three cars require about four hours). Masking, lettering and painting of the blue-white-red cars require two men.

Studies by the BAR mechanical department's cost control showed that the first 115 cars painted after the new shop went into operation were done with a reduction of 20.9 per cent in man-hours as compared with the last 115 comparable cars painted under the old system. This will be further reduced as the new shop routines are refined.

Large Trackmobile, recently acquired, now handles the outside car moving at Derby shop. Moving out is one of the first of the cars carrying the BAR's latest paint scheme.

Regular washing of freight cars has been mech nized at Northern Maine Junction. Platforms 7 ft long on each side of this track make possi use of truck with Ross & White washer.

Labor expended in painting the colorful blue-white-red cars was reduced fully one-third with the new shop. Savings in labor are not the only benefits. It is believed that the improved surface preparation will increase paint life by two years. Mechanical superintendent V. L. Ladd estimates overall yearly savings of $66,000—mostly in extended pa life on the BAR's growing car fleet.

The Bangor & Aroostook is provi that a diversity of painting arrangeme and colors need not prevent establi ing a production line. At the same ti the new shop is showing that even railroad with a modest car fleet c successfully operate such a line, and c tain the benefits of production paint procedures.

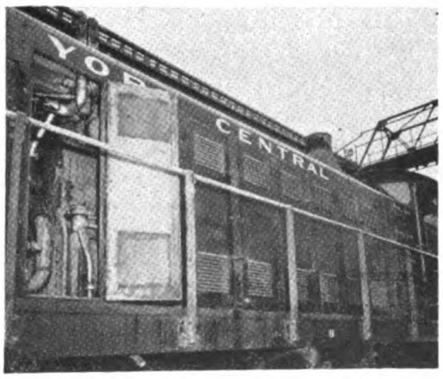
NYC Modifies Temperature Control

THE NEW YORK CENTRAL, to combat piston ring wear, fuel dilution and poor combustion, has installed new temperature controls on some of its older 600- and 1,000-hp Alco switchers. These units originally were equipped with mechanically driven fans operating continuously. Temperature control was maintained with the shutters. During the winter, the shutters occasionally leaked enough cold air to bring the temperature below that needed for maximum efficiency and caused excess wear on parts.

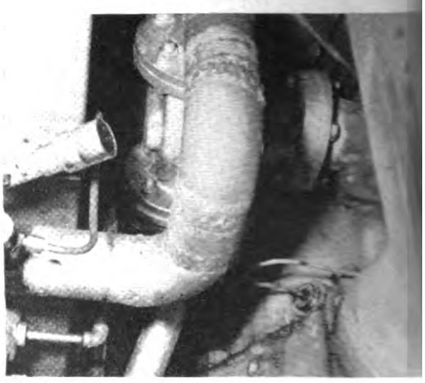
The Central's mechanical department, seeking an automatic, low-cost device that would hold the engine temperature to a minimum of approximately 150 deg and provide sufficient cooling to hold the maximum temperature below 180 deg during hot weather with the engine under heavy load, found valves last year that have solved the problem. Two valves—one manufactured by the Fulton Division of Robertshaw-Fulton Controls Company and the other, by the Amot Controls Corporation—were installed in two of the Central's diesels in 1957. They are balanced valves actuated by a plastic element which expands rapidly with relatively small temperature rises. The only alteration on the locomotive was the drilling of two ½-in. holes to allow sufficient water to circulate through the radiators to prevent freezing.

The performance of the test valves resulted in an operating temperature of 150 deg during several hours idling at outside temperatures of 15 deg. Engine operating temperatures ranged between 150 deg and 160 deg at all times regardless of road conditions. Combusti in the engine cylinders was excelle and a cab temperature of 84 deg w maintained with the engineer's cab wi dow open and all other doors and wi dows closed. The units have operat through two winters.

Engines equipped with this device installed by the New York Centr should show savings in fuel due to o taining proper combustion at all tim a reduction in cylinder liner and pist ring wear, the virtual elimination fuel dilution in the lubricating oil, a the maintenance of warm cabs duri severely cold weather.



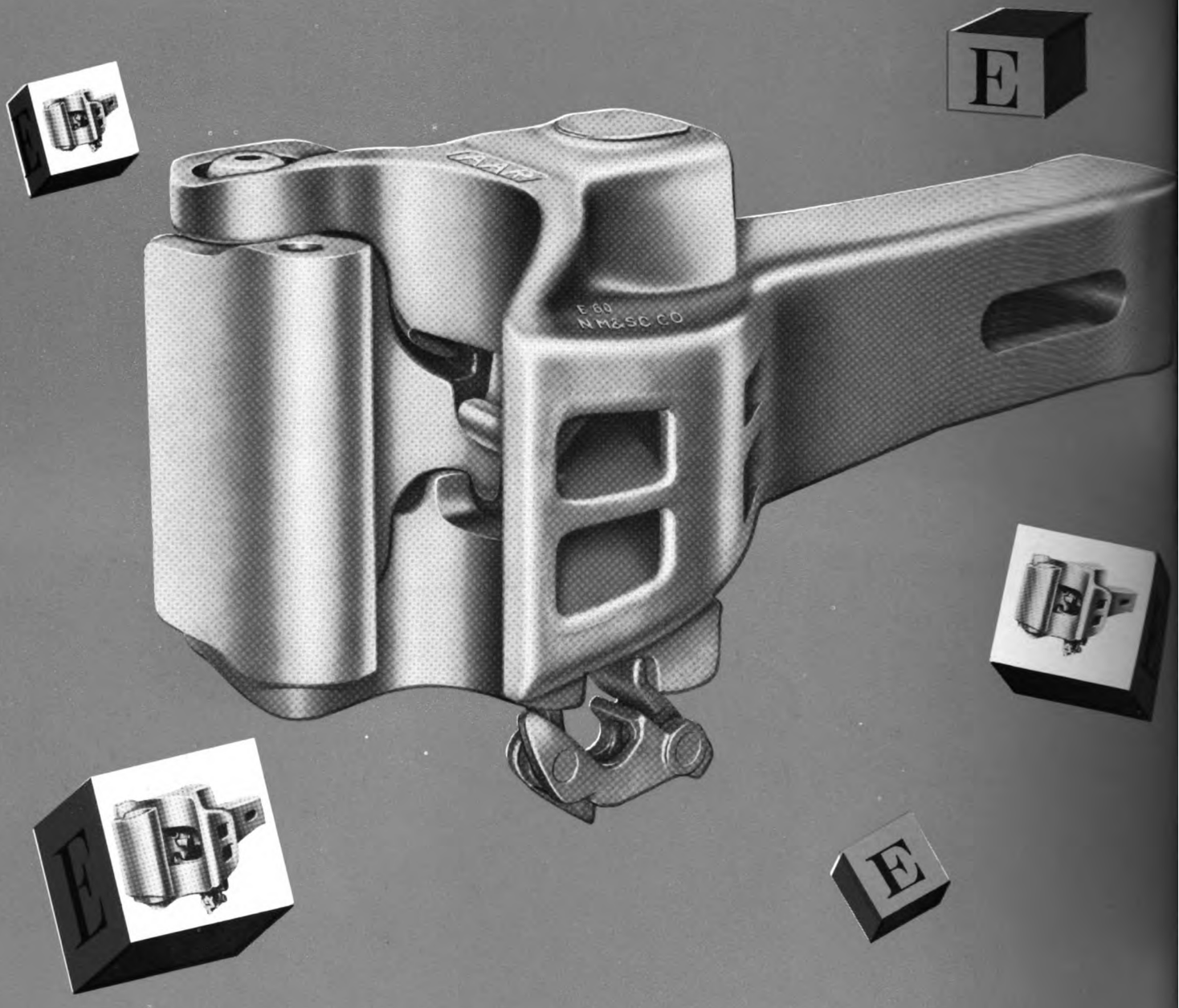
Temperature control is located on the front of the diesel engine back of the radiator.



New design is applied in engine water outlet a required no modification of piping.

Any way you look at it...

NATIONAL



NATIONAL TYPE E COUPLER

the leading freight coupler

Ever since National's basic design of the first standard railroad coupler in 1916, National has been in the forefront of all coupler research and development.

Today, National's leadership in coupler development, testing and production is more pronounced than ever. It is based on closest quality control, unparalleled testing facilities, national and international service.

Any way you look at it, the name *National spells coupler service.*

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Two valves—one
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Controls Company an

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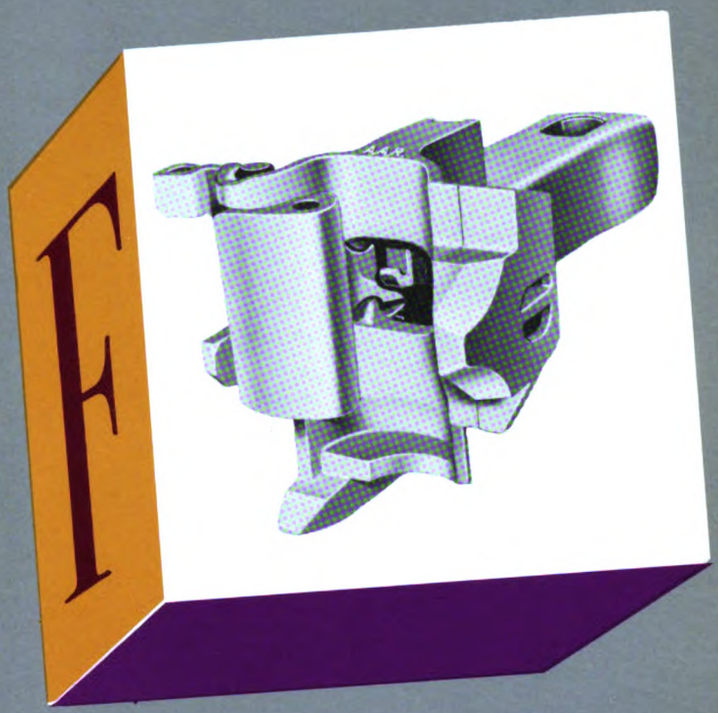
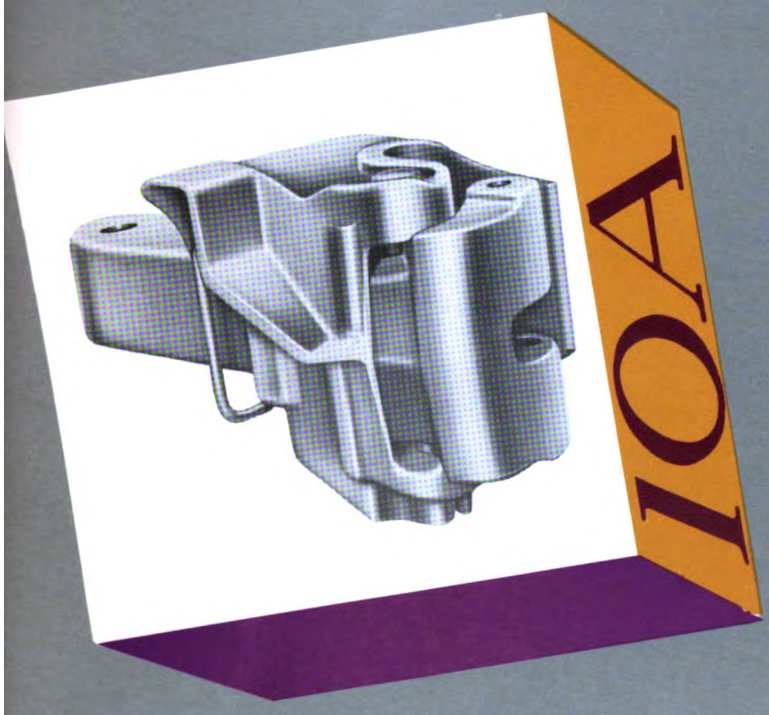
NATIONAL TYPE H TIGHTLOCK COUPLER

the leading passenger coupler.



NATIONAL TYPE F INTERLOCKING COUPLER

the latest freight coupler design.



NATIONAL SHARON-10A AUTOMATIC COUPLER

for freight and passenger cars, locomotives, industrial and mine cars, and city transit cars.

NATIONAL
SPECIALTIES

the Key to Successful Railroad

Coupler repair parts from National

keep couplers operating better . . . longer

AAR Standard Type E Coupler Parts

Knuckle No. E50

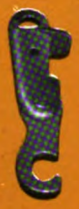
Knuckle Thrower No. E30

Lock No. E40

Knuckle Pivot Pin No. C10

Top Lock Lifter Hole Cap No. E2 Malleable Iron

Top Lock Lifter Hole Cap No. E2-A Pressed Steel



Top Lock Lifter Assembly No. E6-A

Articulated Rotary Locklift Assembly— Single No. E24A

Articulated Rotary Locklift Assembly— Double No. E25A

Note: When ordering Lock Lifters for either ... or bottom operated couplers, the complete ... sembly of lifter parts should be specified.

AAR Alternate Standard Type F Interlocking Coupler Parts

Knuckle No. F51

Knuckle Pivot Pin No. C10

Lock No. F41

Pin Bearing Block, No. F65 and Pin Bearing Block Retaining Spring, No. F66

Knuckle Thrower No. F31

Rotary Locklift Assembly No. F7

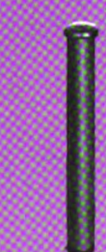
Rotor, Single No. F8

Rotary Locklift Assembly, F7 and Single Rotor, F8 Assembled

AAR Standard Type H Tightlock Coupler Parts

Knuckle No. H50-B

Lock No. H40-A



Knuckle Pivot Pin No. C10

Support Pin No. C2

Rotary Lock-liftAssembly, Double, No. H16-A

Knuckle Thrower No. H30-A

Rotary Lock-liftAssembly, Single, No. H15-A

the railroads are moving ahead with NATIONAL SPECIALTIES

NATIONAL MALLEABLE and STEEL **CASTINGS COMPANY**

Established 1868

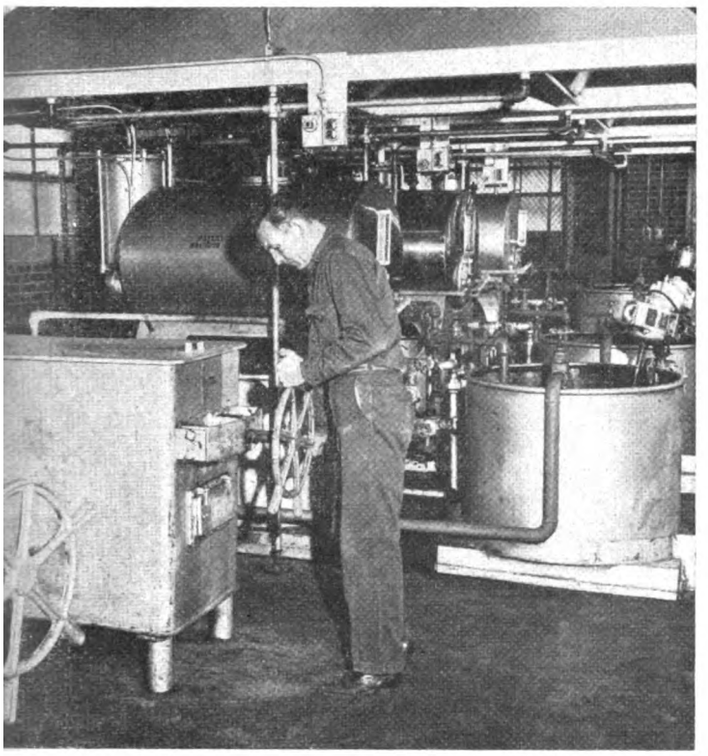
COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • JOURNAL BOXES

Railway Division Headquarters
Cleveland 6, Ohio

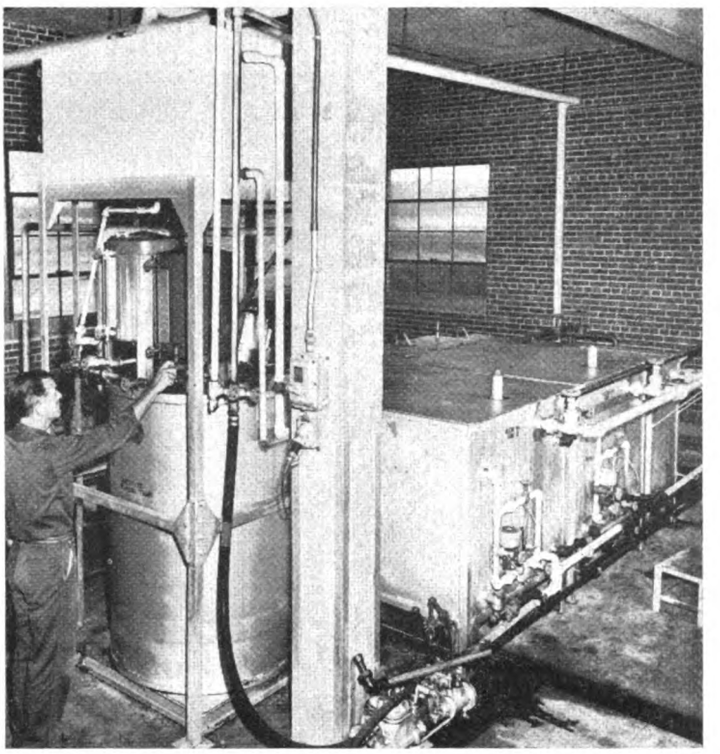
International Division Headquarters
Cleveland 6, Ohio

CANADIAN SUBSIDIARY
National Malleable and Steel Castings Company of Canada, Ltd. • Toronto 1, Ontario

LEADER TO PROGRESS
P R I MEMBER



ilter press (foreground) is used to remove the clay and contaminants from he oil. Previously, clay or diatomaceous earth is added to the dirty oil in ixing tanks at rear. Electric mixers do the blending.



Additives are placed in clean oil in special mixing tank and final product conforms to original specifications. At rear are clean oil tanks from which 200-gal batches are drawn for processing.

Santa Fe Gets New Oil from Old

The Santa Fe's new lubricating oil eclamation plant at the Topeka, Kanas, shops was placed in operation late ast year. Supervised by the mechanical nd research departments, it operates on 1 24-hour basis, five days each week. The plant is designed to clean and forify used diesel locomotive lubricating ils for re-use. Substantial savings esult.

The present output of the plant is 7,000 gal per week. A modified disillation process combined with double iltration is used to restore lubricants to heir original condition. The several rands of oil used are processed separately, and each is refortified to its original specification. Brand identity of the oil is retained through the entire reclamation process. Quality checks by the chemical laboratory assure an oil equal to the quality of new oil.

This reclamation plant is installed in a 36-ft x 65-ft fireproof brick and concrete structure which has an office and locker room in addition to the refining equipment. The equipment in the building consists of three 100-gal Refinoil machines each with mixing tanks, heat exchanger, retort and condensing equipment. There are two primary filters and one secondary unit.

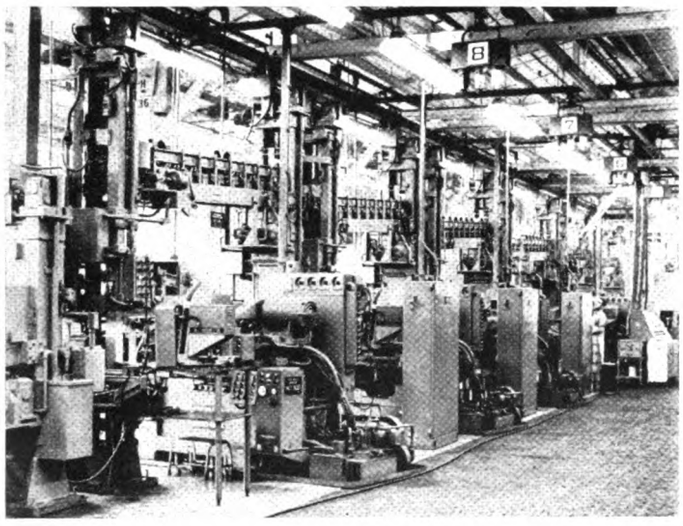
Inside the building are three storage tanks—one for condensed light oil and two equipped with thermostats and heating units for holding the oil prior to refortification. Four centrifugal pumps move the oil between the various storage and processing operations. Outside the building are two 10,000-gal tanks for holding oil when first received for reclamation. A three-compartment tank holds the oil after reclamation.

The dirty oil is shipped into the plant in either tank cars or drums, and contains contaminants of several different types—carbon, water, light oils, and plain dirt. Water and light oils are driven off by distillation, and carbon, dirt and some chemical materials are removed by filtration. Tank car shipments are pumped into a 10,000-gal storage tank equipped with thermostatically-controlled steam coils. This tank provides for gravitational settling of heavier contaminants prior to processing the oil through the plant. From here, oil is pumped into a heated 2,000-gal batch tank. Shipments of dirty oil in drums are emptied directly into this tank for settling.

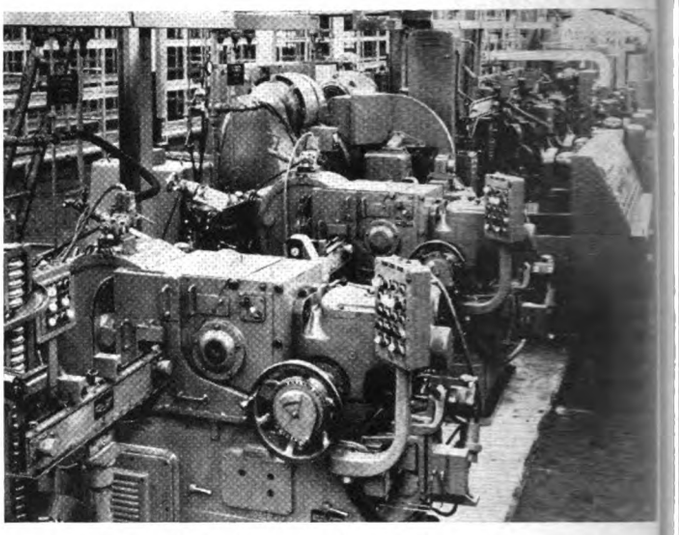
The stills, or heating chambers, have a capacity of 100 gal. The oil is heated to 600 deg F and held at this temperature to draw off the water and light ends. The light ends are condensed and placed in a storage tank for use as fuel in the power plant. After the oil is cooled, it is dumped into a 100-gal mixing tank. A diatomaceous earth or clay is added as an absorbent and filtering aid. The quantity depends on the type of oil. Electric blenders mix the oil and clay together. This mixture is piped to a filter press, with the piping arranged so the mixing tanks can empty into any of the presses. Each filter press has a series of perforated iron plates. Between each plate is a filter paper. The mixture is pumped under pressure through the filters which pick up the clay with the contaminants. As an additional precaution, the oil is passed through a secondary, or polishing filter, which further refines it. The secondary filter also acts to prevent oil and clay from getting into the pipe lines, in case there should be a failure of the primary filters.

The refined oil then passes to storage tanks to await blending with the desired additive. The blending tank has a capacity of 200 gal and after thorough mixing and analysis, the oil is either pumped directly into tank cars for shipment or to a 10,000-gal reclaimed oil storage tank. This tank is divided into three compartments for storage of different brands of oil if so desired.

New Timken Plant Can Produce . . .



Heat treated cups are completely ground in eight operations on a line of as many grinders with automatic handling between machines.



A spiral elevator lifts rollers from floor level hopper into the Cincinn grinder at the rate of 38 per min for the "first pass."

160,000 Freight-Car Roller Bearings a Year

TIMKEN OPENED recently its $7,150,000 railroad bearing production line at Columbus, Ohio. Equipped to produce 20,000 freight car sets per year the plant features automatic machining, heat-treating and materials-handling equipment.

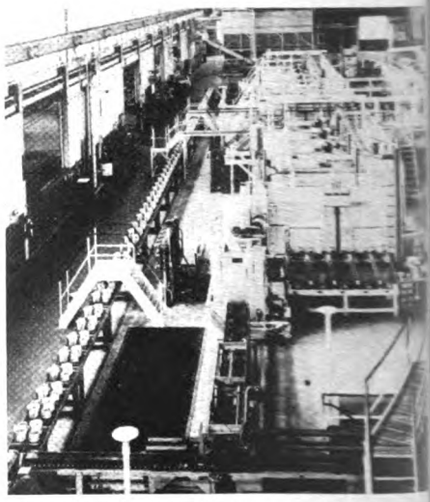
The five standard car sizes from 4¼ in. x 8 in. to 6½ in. x 12 in. will be manufactured on this line. Each size will be produced in quantity as a changeover in set-up must be made for each bearing.

Three major operations are performed by the line: green machining, heat treating and grinding. Bearing cups and cones are made from steel tubing. All operations, turning, boring, cutting are completed by automatic machines. After being marked for identification, they are heat treated, then delivered to the grinding line for final machining.

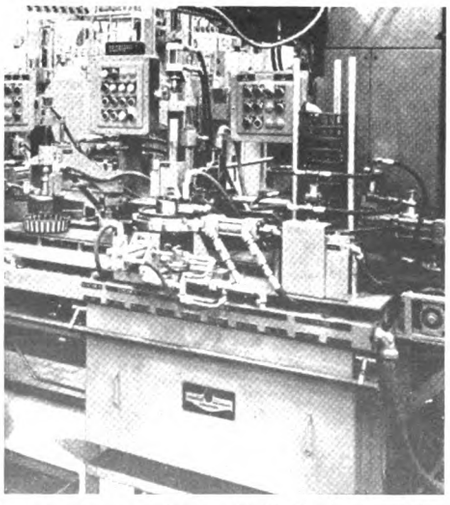
The rollers are made from bar stock. The operations are similar to those used to produce the cups and cones. After heat treatment the rollers are delivered to the grinding line where a spiral elevator feeder delivers them to the machines at the rate of 38 per min. Six grinding operations are performed. In the conveyor line gauges check roller size and length and automatically control the compensation for grinding wheel wear. By green, yellow and red overhead lights the operator of the grinding line can tell at a glance if a machine is either operating, waiting for some reason, or stopped requiring attention. Rollers are kept in sequence to make sure that all rollers in each bearing are as uniform as possible.

After inspection and the application of protective coatings to cups and cones all parts are brought together and assembled automatically. The assembled cones then are conveyed to a battery of machines where they are run in under load.

At the final assembly station one cup and two cones are assembled with a spacer of known length, then checked for lateral clearance. Next, the cone assemblies are greased and reassembled with the correct production spacer. Finally, the bearing receives a metered amount of grease and the grease seals. It is weighed to insure that the correct amount of grease has been added. Seal wear rings, cone backing rings and axle end cups are banded to the assembly before boxing for shipment.



About 40 hr are needed to completely heat tr one piece in the carburizing furnaces.



In less than a minute the final cone machine assembles and checks all parts.

At photo-electric inspection rollers revolve i light beam which detects surface defects.

laking Progress in Face of Financial Problems

Journal performance, periodic interchange maintenance, and increasing scope of Federal regulation confront members at 31st AAR Mechanical Division meeting.

'Our research has already developed . . . ter ways of doing what we do in mechan- l departments, if we could finance them," M. Keller, AAR vice president—research, d the 31st annual meeting of the AAR echanical Division in Chicago. "What is of ncern," he warned, is how to cope with ch a situation and how to obtain some of ese improvements in equipment in spite of ch a situation." C. E. Pond, division chair- an, paid tribute to the work of the com ttees of the Division and said their activities ow there are "no curtailments in the de- lopment of better equipment and more icient procedures."

A substantial increase in committee work ad has resulted from the hearings conducted Federal regulatory agencies. "Many of the les and regulations under which railroads e now operating need revision due to anged conditions and technological progress at railroads have made in recent years," nd continued.

"The gradual accumulation of controls—the ow infiltration of government into every ase of our operations—will surely impose ore financial burdens than this industry can ar," warned R. G. May, AAR vice presi- nt, in discussing enacted and pending deral legislation. "These bills seem to ignore at our safety program is one of the best ganized and most effective of any industry."

The recently-revised Locomotive Inspection ules and the recently-enacted Train Brake ct were discussed by W. M. Keller. Progress nnot thrive on restraint, he cautioned, and t is hoped those regulatory bodies having risdiction in such matters will fully evaluate proved equipment and its ability to operate er long distances without attention. . . The forts of our equipment maintenance em- oyees should be used in shops where their ork can be most effective rather than at ints where neither facilities nor conditions e conductive to best maintenance standards."

R. L. Dearmont, president of the Missouri Pacific, said that the benefits of dieselization may have made railroads unresponsive to other rising costs and called for an end to money wasted in three categories—funds expended in the payment of loss and damage claims, in the settlement of personal injury cases, and in paying for wrecks and derailments due to man and machine failure. All of these are of concern to mechanical officers. Mr. Dearmont called for a solution to the hot box problem and said that this requires general action because it is "something individual railroads can't do by themselves."

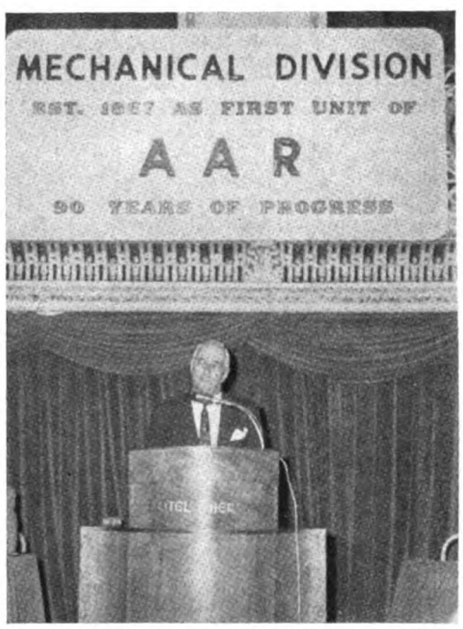
More realistic depreciation allowances could be a factor in stimulating heavy new railroad capital spending, Mr. May stated in summarizing future legislative goals. "We urge Congress to take action to allow railroads to establish construction reserve funds on their books as a means not only to develop better railroads, but also to stimulate and stabilize production and employment in the million-man railroad supply industry. This form of tax deferment is one of the most effective that can be taken to ease the plight of the industry and to assist all who depend on it."

More To Do

H. C. Wyatt, vice president and general manager of the Norfolk & Western, called for the correction of weaknesses in today's equipment. "Both operating costs and operating performance are governed to a substantial extent by the design, maintenance and servicing of locomotives and cars," he said. Two phases of locomotive operation requiring "constructive vision and thinking," outlined by the speaker, are new methods for improving wheel-rail adhesion and for lubrication of wheel flanges.

"Greatest opportunity for improvement" is in the freight car field, according to Mr. Wyatt. Air brakes need improvement. Reduction of charging time, unitized assemblies and more trouble-free operation are goals yet to be achieved. Draft gears and car flooring and lining will have to be better.

"Very little progress has been made in providing at reasonable cost a bearing assembly that does not need to be continually nursed. The number of hot boxes on American railroads is approximately the same as it was five years ago . . . If the railroad industry expects to get maximum benefit from improved lubricating devices, they should be used by all of the carriers," he emphasized.



Missouri Pacific's President R. L. Dearmont addressing joint session of Mechanical Division and Electrical Section.

Mechanical Division's New Officers

S. M. Houston
Gen. S.M.P.
SP

S. M. Houston, general superintendent, mechanical department, Southern Pacific, has been elected chairman of the AAR Mechanical Division for a two-year term expiring in June 1906, succeeding C. E. Pond, general superintendent motive power, N.&W.

In other election results announced at the closing session of the Division's annual meeting, J. W. Hawthorne, general superintendent motive power and equipment, Atlantic Coast Line, was elected vice chairman and seven members of the General Committee were re-elected to new two-year terms. These include T. T. Blickle, AT&SF; R. E. Franklin, Southern; J. H. Heron, GN; W. F. Kascal, NYC; D. S. Neuhart, UP; C. E. Pond, N &W; and F. B. Rykoskey, B&O.

J. W. Hawthorne
Gen. S.M.P. and E.
ACL

Atlantic City Meeting Postponed

Due to present economic conditions, the Atlantic City meeting in 1959 has been postponed. Because of the postponement, the General Committee has scheduled next year's Mechanical Division meeting at Chicago.

By special letter ballot, the membership of the General Committee was increased from 13 to 15 members. The Mechanical Division's Rules of Order are being completely reviewed to incorporate this change and also other changes that may be desirable. The revision will be submitted to member roads for consideration.

Hot-Box Records

Records of several of the larger roads show that cars with journal lubricators give from two to five times better performance than cars with loose journal packing. The improvement in the hot-box record for late 1957 and early 1958 is attributed to the greater percentage of lubricators in service.

Three proposals were made to improve the hot-box record on tank and other privately owned cars: (1) Request all interchange bureaus to arrange meetings with mechanical representatives of the tank and other private car companies. (These meetings are to include on-the-spot inspections of the cars. It was pointed out that meetings of this type resulted in an improvement in the hot-box situation in the west coast area). (2) Private car lines are to be encouraged to increase their application of journal lubricators as they lag in this program, and (3) Institute a program on all railroads for removing from service all private car line cars with trucks in bad condition.

Rules Changes

Changes in the Interchange Rules governing the transition from cast-iron to steel wheels were clarified by a circular letter dated January 29, 1958. This circular outlined in detail the procedures to be followed.

By the "Power or Train Brakes Safety Appliance Act of 1958," effective August 9, 1958, the AAR rules for inspection, testing and maintenance of air-brake equipment on locomotives and cars, as revised in July 1957, will become the rules of the ICC. This is the so-called Red Book. A permanent liaison committee has been named to handle questions pertaining to interpretation of the Red Book.

Special Committee on Ex Parte 174

Ex Parte No. 174, the order of the ICC on "Rules and Instructions for Inspection and Testing of Locomotives other than Steam," was released on April 1, 1958. The General Committee noted that certain new proposals and amendments are still remaining in this order which might impose substantial and unnecessary burdens. This is particularly true if they should be interpreted and applied in an unfair manner. A special committee has been appointed and is now engaged in the task of developing clarifications of a number of questionable details. Each railroad is to report to this committee where interpretation and application of any of the rules conflict with the standing practice of the railroad or with the railroad's own interpretation of the correct meaning and application of the rules. This special committee will not restrict any railroad from handling differences directly with the ICC or its staff. However, each railroad is asked to advise the special committee of these differences and the results obtained.

Loose-Leaf Loading Rules

A matter of discussion for several years, printing of Load Rules pamphlets in loose-leaf form, has been resolved in favor of this method. It is expected that this change can be made so the Loading Rules can be issued loose-leaf either late this year or early 1959.

The AAR Wheel and Axle Manual is being revised, but no decision has been made on the date of issue.

Piggy-Back Standardization

Interchange of piggy-back cars is on the increase. With this fact in mind the Car Construction committee points out the increasing importance of equipment standardization. Development work has made this objective impossible during the past few years. Now the committee believes that the peak of development has been reached and attention can be given to standards for interchange service.

Although standardization is essential the committee does not want it at the expense of further progress in this field. It reported the following six developments in piggy-back equipment:

1. ACF retractable trailer hitch. A single tie-down retractable device with built-in rubber draft gear that fastens to the trailer king pin.

2. Clark Mobilvan sysem. An anchor system for fastening shipping containers to flat cars. It consists of the Mobilock latching mechanism that is installed on the bottom of shipping containers and the Mobilplank anchor mechanism applied in the decking of flat cars for locking containers to these cars.

3. Pulmann-Standard Trailmobile container system. A flat car designed to carry trailers with an arrangement for application of a fifth-wheel stand. Adjustable safety chains are provided for rear of trailers. This car is also adaptable for carrying containers, utilizing the fifth-wheel stand to support one end of container with other end supported at sides of car by means of adjustable brackets.

4. Flat Car equipped with two turntables. This is a flat car, designed by Seatrain Lines, Inc., equipped with two turntables for handling vans.

5. Southern Pacific Piggy-Back, Inc. cars. These cars were built in S. P. shops under license by Piggy-Back, Inc. They were built with a center sill made up of two I beams, end sill and bolsters. Running boards and railings are secured to cross members that are supported by the center sill for use of trainmen. These cars are equipped with shock absorbers and locking bars. Trailers used with this system are equipped with dollies, two per axle, each having two flanged wheels that ride on the outside flanges of the center sill I beam.

6. Brandon-Russell rolling bridge for piggy-back cars. A type of apron that is a rolling bridge for spanning the opening between piggy-back cars. This design incorporates two flanged wheels attached to the inner end of the bridge which roll on a track located just below the deck level. Two additional flanged wheels are attached to a curved centilever spring which is attached to the bridge understructure and extends slightly beyond the end of the car. When moving the bridge from running to loading position it is shoved towards the adjacent car. It is held slightly above car deck level by the spring action until the overhang causes sufficient load on the springs to permit the outer end of the bridge to rest on the deck of the opposite car. Safety latches lock the bridge in either running or loading position.

In addition to the developments listed above, there have been a number of tie-down arrangements designed by railroads and other industries.

Eighteen letter ballot items were included in the Car Construction report. Some of these items are covered in other reports.

A note is to be added to Manual page C-3—Fundamentals of Car Design, directing attention to the maximum permissable height of 84 in. for the center of gravity of a [illegible] car without the necessity of a requir[illegible] special handling.

Plate B of the Supplement to Ma[illegible] to be modified by the addition of a ne[illegible] directing attention to the necessity for [illegible] creasing width of cars designed with [illegible] centers longer than 41 ft 3 in.

Plate C-2 of the Supplement to M[illegible] covering "Specifications for Standard Fr[illegible] Refrigerator Cars" is to be brought [illegible] date. Changes involve 12 items. Specia[illegible] steels may be substituted as construction [illegible] terials. The inside lining of doors m[illegible] flush with car lining. Insulating materials [illegible] to be submitted to the AAR Research C[illegible] for test and changes are recommended [illegible] fire-resistant requirements. Other ch[illegible] cover construction details, location of [illegible] to avoid dripping on journal boxes [illegible] openings and plugs and threshold plat[illegible]

The Standard, "Sills, Steel and Spl[illegible] shown on Manual pages C-10 to C-[illegible] inclusive, is to be revised to include [illegible] advancement in the art.

Manual page E-28 showing locati[illegible] angle cock is to be revised. This change [illegible] commended to correct conditions now [illegible] ing cut hoses. Dragging hoses are also [illegible] ating dragging equipment detectors.

Car lumber preservative treatment [illegible] used, is to be in accordance with the Am[illegible] can Wood Preservers Association Stan[illegible] No. C-15.

Plate D, permissible alternates of [illegible] Supplement to Manual, is to be modifi[illegible] require the use of two (instead of [illegible] in., 6.7 lb per ft steel Z-sections each [illegible] of center sills when using nailable steel [illegible] or composite metal and wood floors.

Diesel Designs "Frozen"

With one exception the Committee on [illegible] motives found that the buyer of [illegible] power has very little from which to cho[illegible] It noted that diesel electrics are so [illegible] standardized that the designs are virtu[illegible] "frozen." This situation, it said, effects e[illegible] omies in parts, exacts a high penal[illegible] design progress.

The exception is the gas turbine e[illegible] locomotive. Twenty-five 4,500-hp gas t[illegible] electrics, delivered in 1952, '53 and '[illegible] the Union Pacific, continued in service. S[illegible] to be delivered by General Electric to [illegible] same road are fifteen 8,500-hp locomo[illegible] of the same type. At the end of 195[illegible] 4,500-hp locomotives had operated a tota[illegible] 11,519,019 miles. In freight service this p[illegible] averaged 8,850 locomotives-miles per m[illegible] during 1957. This was a 12.33 decrease [illegible] the 1956 figure.

Since 1952 one of the gas turbines [illegible] accumulated 24,340 hr, the highest [illegible] hours for any turbine in the group. [illegible] history of this turbine, given in the re[illegible] shows a significant trend of longer per[illegible] between removals. Life of turbine com[illegible] ents has increased steadily. At the en[illegible] 1957 the average turbine hours per rem[illegible] for the previous six years was 3,386. It [illegible] 2,969 at the end of 1956 for the pre[illegible] five years.

EMD To Build Free-Poston Locomotive

The committee was advised in Dece[illegible] 1957 by Electro-Motive that the state [illegible] development of the free-piston engine [illegible] turbine warrants a field application [illegible]

's to build an experimental locomotive
g a 2,000-hp twin-cylinder free-piston
ne. A 1,000-hp single-cylinder engine was
l during most of the development work
EMD had designed and had in opera-
the twin-cylinder engine at the end of
year. The locomotive will have this GM-
free-piston engine with matching tur-
and a gear box. It will be equipped
a standard traction-generator, traction
ors and controls. The engine will burn
lowest cost fuels obtainable.

tus of Other Turbines

)n December 31, 1957, the Norfolk &
ıtern retired permanently its experimental
)0-hp coal-burning steam turbine electric
)motive. This unit had been placed in
'ice in 1954.
ıdditional information was given by the
omotive Development Committee on the
l fired gas turbine locomotive equipment.
:se data covered work in 1956 and 1957
the coal system, coal pumps, pulverizer,
ıbustors, flyash separator and the turbine.
: report did not mention future plans for
development of this equipment.
The committee also reviewed the 300-hp
turbine mechanical drive locomotive built
the Transportation Corps by Davenport
ıler. It included mention of several Euro-
ın turbine locomotives in the report.

oposed Nuclear Locomotive

Baldwin-Lima-Hamilton and the Denver
Rio Grande Western are continuing a
ısibility study under a contract with the
omic Energy Commission. The power plant
ıign is still under consideration.
The committee felt that the comments of
. Edmund Teller, one of the world's lead-
; nuclear physicists, was worth reprinting
e RL&C, Dec. 1957, p 10). Appearing
the 1957 Fall issue of The Lamp, published
the Standard Oil Company of New Jersey,
'. Teller said, "I think such a machine is
most ingenious solution to the question of
w to combine minimum utility with maxi-
ım danger. Trains in the atomic age will
doubt be electric."

il or Grease?

Study has been made to determine the ad-
ntages of oil and grease lubrication for
ller journal bearings on diesel or gas-turbine
comotives. Oil is a better lubricant but
ore difficult to retain. The lack of perfect
l seals led to tests of greases. The committee
id that a less efficient lubricant that can be
tained may give a better performance than
perfect lubricant difficult of retention.
With Timken and SKF bearings the com-
ittee said that successful experience makes
ıange from oil to grease safe without exten-
ve tests. Grease lubrication of Hyatt bear-
gs is in the test stage. Some of the tests
ready made on grease lubrication of Hyatt
earing seemed contradictory. The committee
oted that speed, curvature and hardness of
rease affected the results with respect to
ıe successful lubrication of the lateral thrust
ı these bearings.

)ther Diesel Subjects

Because of variations between railroads
he committee suggested the following sys-
em for classifying diesel locomotive repairs:
Class 1. Mileage or Time Inspection and
)verhaul of mechanical and electrical equip-
nent including top deck overhaul or com-
)lete overhaul of the diesel engine.

The work distinguishing Class 1 is top deck overhaul or complete overhaul of the diesel engine.

Class 2. Inspection and repair work of mechanical and electrical components including top deck overhaul, or complete overhaul of the diesel engine (or a new engine) and removal and overhaul of main generator.

The work distinguishing Class 2 is the removal of main generator for overhaul.

Class 3. General repairs to the body structure including re-wiring, repiping where necessary, top deck overhaul or complete overhaul of diesel engine and removal of main generator for overhaul.

The work distinguishing Class 3 is general repair to body structure.

The committee is also working on a code of rules outlining the proper method for storing diesel locomotives.

Diagrams now shown in Sec. F, Pg. 240, of the AAR Manual are not generally in conformity with an interpretation given by the ICC Bureau of Safety. To meet the bureau's minimum requirements the sanding arrangements shown by diagrams accompanying the report were developed. The locomotive committee recommends these arrangements as a letter ballot item.

Mandatory Lubricator Date Goes Unchanged

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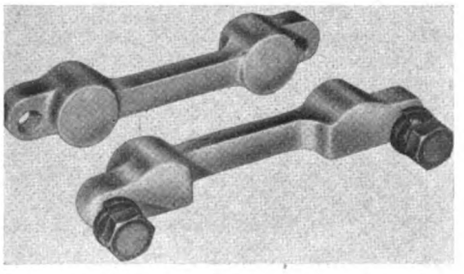

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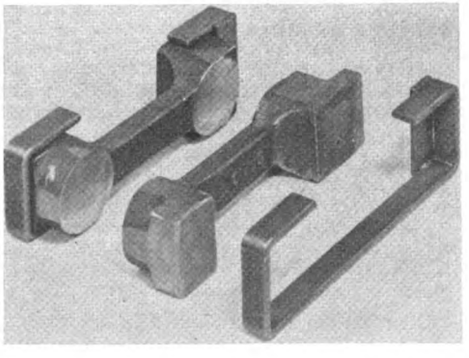

Hot-Box Records

Records of several of the larger roads show that cars with journal lubricators give from two to five times better performance than cars with loose journal packing. The improvement in the hot-box record for late 1957 and early 1958 is attributed to the greater percentage of lubricators in service.

Three proposals were made to improve the hot-box record on tank and other privately owned cars: (1) Request all interchange bureaus to arrange meetings with mechanical representatives of the tank and other private car companies. (These meetings are to include on-the-spot inspections of the cars. It was pointed out that meetings of this type resulted in an improvement in the hot-box situation in the west coast area). (2) Private car lines are to be encouraged to increase their application of journal lubricators as they lag in this program, and (3) Institute a program on all railroads for removing from service all private car line cars with trucks in bad condition.

Rules Changes

Changes in the Interchange Rules governing the transition from cast-iron to steel wheels were clarified by a circular letter dated January 29, 1958. This circular outlined in detail the procedures to be followed.

By the "Power or Train Brakes Safety Appliance Act of 1958," effective August 9, 1958, the AAR rules for inspection, testing and maintenance of air-brake equipment on locomotives and cars, as revised in July 1957, will become the rules of the ICC. This is the so-called Red Book. A permanent liaison committee has been named to handle questions pertaining to interpretation of the Red Book.

Special Committee on Ex Parte 174

Ex Parte No. 174, the order of the ICC on "Rules and Instructions for Inspection and Testing of Locomotives other than Steam," was released on April 1, 1958. The General Committee noted that certain new proposals and amendments are still remaining in this order which might impose substantial and unnecessary burdens. This is particularly true if they should be interpreted and applied in an unfair manner. A special committee has been appointed and is now engaged in the task of developing clarifications of a number of questionable details. Each railroad is to report to this committee where interpretation and application of any of the rules conflict with the standing practice of the railroad or with the railroad's own interpretation of the correct meaning and application of the rules. This special committee will not restrict any railroad from handling differences directly with the ICC or its staff. However, each railroad is asked to advise the special committee of these differences and the results obtained.

Loose-Leaf Loading Rules

A matter of discussion for several years, printing of Load Rules pamphlets in loose-leaf form, has been resolved in favor of this method. It is expected that this change can be made so the Loading Rules can be issued loose-leaf either late this year or early 1959.

The AAR Wheel and Axle Manual is being revised, but no decision has been made on the date of issue.

Piggy-Back Standardization

Interchange of piggy-back cars is on the increase. With this fact in mind the Car Construction committee points out the increasing importance of equipment standardization. Development work has made this objective impossible during the past few years. Now the committee believes that the peak of development has been reached and attention can be given to standards for interchange service.

Although standardization is essential the committee does not want it at the expense of further progress in this field. It reported the following six developments in piggy-back equipment:

1. ACF retractable trailer hitch. A single tie-down retractable device with built-in rubber draft gear that fastens to the trailer king pin.

2. Clark Mobilvan sysem. An anchor system for fastening shipping containers to flat cars. It consists of the Mobilock latching mechanism that is installed on the bottom of shipping containers and the Mobilplank anchor mechanism applied in the decking of flat cars for locking containers to these cars.

3. Pulmann-Standard Trailmobile container system. A flat car designed to carry trailers with an arrangement for application of a fifth-wheel stand. Adjustable safety chains are provided for rear of trailers. This car is also adaptable for carrying containers, utilizing the fifth-wheel stand to support one end of container with other end supported at sides of car by means of adjustable brackets.

4. Flat Car equipped with two turntables. This is a flat car, designed by Seatrain Lines, Inc., equipped with two turntables for handling vans.

5. Southern Pacific Piggy-Back, Inc. cars. These cars were built in S. P. shops under license by Piggy-Back, Inc. They were built with a center sill made up of two I beams, end sill and bolsters. Running boards and railings are secured to cross members that are supported by the center sill for use of trainmen. These cars are equipped with shock absorbers and locking bars. Trailers used with this system are equipped with dollies, two per axle, each having two flanged wheels that ride on the outside flanges of the center sill I beam.

6. Brandon-Russell rolling bridge for piggy-back cars. A type of apron that is a rolling bridge for spanning the opening between piggy-back cars. This design incorporates two flanged wheels attached to the inner end of the bridge which roll on a track located just below the deck level. Two additional flanged wheels are attached to a curved centilever spring which is attached to the bridge understructure and extends slightly beyond the end of the car. When moving the bridge from running to loading position it is shoved towards the adjacent car. It is held slightly above car deck level by the spring action until the overhang causes sufficient load on the springs to permit the outer end of the bridge to rest on the deck of the opposite car. Safety latches lock the bridge in either running or loading position.

In addition to the developments listed above, there have been a number of tie-down arrangements designed by railroads and other industries.

Eighteen letter ballot items were included in the Car Construction report. Some of these items are covered in other reports.

A note is to be added to Manual page C-3—Fundamentals of Car Design, directing attention to the maximum permissable height of 84 in. for the center of gravity of a loaded car without the necessity of a request for special handling.

Plate B of the Supplement to Manual is to be modified by the addition of a new note directing attention to the necessity for decreasing width of cars designed with truck centers longer than 41 ft 3 in.

Plate C-2 of the Supplement to Manual covering "Specifications for Standard Freight Refrigerator Cars" is to be brought up-to-date. Changes involve 12 items. Special alloy steels may be substituted as construction materials. The inside lining of doors must be flush with car lining. Insulating materials are to be submitted to the AAR Research Center for test and changes are recommended in fire-resistant requirements. Other changes cover construction details, location of drains to avoid dripping on journal boxes, hatch openings and plugs and threshold plates.

The Standard, "Sills, Steel and Splicing" shown on Manual pages C-10 to C-16-A, inclusive, is to be revised to include latest advancement in the art.

Manual page E-28 showing location of angle cock is to be revised. This change is recommended to correct conditions now causing cut hoses. Dragging hoses are also operating dragging equipment detectors.

Car lumber preservative treatment, when used, is to be in accordance with the American Wood Preservers Association Standard No. C-15.

Plate D, permissible alternates of the Supplement to Manual, is to be modified to require the use of two (instead of one) 3 in., 6.7 lb per ft steel Z-sections each side of center sills when using nailable steel floors or composite metal and wood floors.

Diesel Designs "Frozen"

With one exception the Committee on Locomotives found that the buyer of motive power has very little from which to choose. It noted that diesel electrics are so well standardized that the designs are virtually "frozen." This situation, it said, effects economies in parts, exacts a high penalty in design progress.

The exception is the gas turbine electric locomotive. Twenty-five 4,500-hp gas turbine electrics, delivered in 1952, '53 and '54 to the Union Pacific, continued in service. Soon to be delivered by General Electric to the same road are fifteen 8,500-hp locomotives of the same type. At the end of 1957 the 4,500-hp locomotives had operated a total of 11,519,019 miles. In freight service this power averaged 8,850 locomotives-miles per month during 1957. This was a 12.33 decrease from the 1956 figure.

Since 1952 one of the gas turbines had accumulated 24,340 hr, the highest total hours for any turbine in the group. The history of this turbine, given in the report shows a significant trend of longer periods between removals. Life of turbine components has increased steadily. At the end of 1957 the average turbine hours per removal for the previous six years was 3,386. It was 2,969 at the end of 1956 for the previous five years.

EMD To Build Free-Poston Locomotive

The committee was advised in December 1957 by Electro-Motive that the state of development of the free-piston engine and turbine warrants a field application. It in-

ends to build an experimental locomotive sing a 2,000-hp twin-cylinder free-piston ngine. A 1,000-hp single-cylinder engine was sed during most of the development work ut EMD had designed and had in operaion the twin-cylinder engine at the end of ast year. The locomotive will have this GM-14 free-piston engine with matching turine and a gear box. It will be equipped vith a standard traction-generator, traction notors and controls. The engine will burn he lowest cost fuels obtainable.

Status of Other Turbines

On December 31, 1957, the Norfolk & Western retired permanently its experimental 4,500-hp coal-burning steam turbine electric ocomotive. This unit had been placed in ervice in 1954.

Additional information was given by the ocomotive Development Committee on the oal fired gas turbine locomotive equipment. These data covered work in 1956 and 1957 n the coal system, coal pumps, pulverizer, combustors, flyash separator and the turbine. The report did not mention future plans for he development of this equipment.

The committee also reviewed the 300-hp as turbine mechanical drive locomotive built or the Transportation Corps by Davenport Besler. It included mention of several European turbine locomotives in the report.

Proposed Nuclear Locomotive

Baldwin-Lima-Hamilton and the Denver & Rio Grande Western are continuing a feasibility study under a contract with the Atomic Energy Commission. The power plant design is still under consideration.

The committee felt that the comments of Dr. Edmund Teller, one of the world's leading nuclear physicists, was worth reprinting (see RL&C, Dec. 1957, p 10). Appearing in the 1957 Fall issue of The Lamp, published by the Standard Oil Company of New Jersey, Dr. Teller said, "I think such a machine is a most ingenious solution to the question of how to combine minimum utility with maximum danger. Trains in the atomic age will no doubt be electric."

Oil or Grease?

Study has been made to determine the advantages of oil and grease lubrication for roller journal bearings on diesel or gas-turbine locomotives. Oil is a better lubricant but more difficult to retain. The lack of perfect oil seals led to tests of greases. The committee said that a less efficient lubricant that can be retained may give a better performance than a perfect lubricant difficult of retention.

With Timken and SKF bearings the committee said that successful experience makes change from oil to grease safe without extensive tests. Grease lubrication of Hyatt bearings is in the test stage. Some of the tests already made on grease lubrication of Hyatt bearing seemed contradictory. The committee noted that speed, curvature and hardness of grease affected the results with respect to the successful lubrication of the lateral thrust in these bearings.

Other Diesel Subjects

Because of variations between railroads the committee suggested the following system for classifying diesel locomotive repairs:

Class 1. Mileage or Time Inspection and overhaul of mechanical and electrical equipment including top deck overhaul or complete overhaul of the diesel engine.

The work distinguishing Class 1 is top deck overhaul or complete overhaul of the diesel engine.

Class 2. Inspection and repair work of mechanical and electrical components including top deck overhaul, or complete overhaul of the diesel engine (or a new engine) and removal and overhaul of main generator.

The work distinguishing Class 2 is the removal of main generator for overhaul.

Class 3. General repairs to the body structure including re-wiring, repiping where necessary, top deck overhaul or complete overhaul of diesel engine and removal of main generator for overhaul.

The work distinguishing Class 3 is general repair to body structure.

The committee is also working on a code of rules outlining the proper method for storing diesel locomotives.

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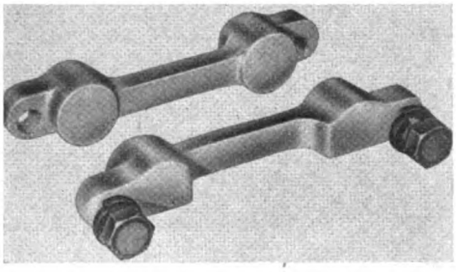

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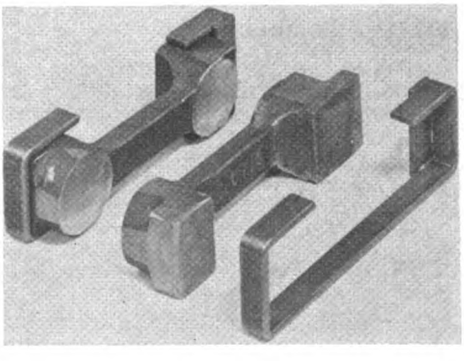


Railroad	Hop.	Box	Gon.	Flat	Other	Total
Akron, Canton & Youngstown	75	1	1	—	6	83
Apalachicola Northern	—	—	—	—	50	50
Atchison, Topeka & Santa Fe	—	575	—	3	290	868
Atlanta & Saint Andrews Bay	—	—	—	—	26	26
Atlantic Coast Line	3,584	948	—	112	2,420	7,064
Baltimore and Ohio	55	10	—	—	—	65
Bangor & Aroostook	—	125	—	—	75	200
Bessemer and Lake Erie	10	—	—	3	—	13
Boston and Maine	426	1,949	—	175	—	2,550
Butte, Anaconda & Pacific	—	—	—	—	202	202
Canadian National	—	—	—	158	1	159
Canadian Pacific	—	—	7	263	—	270
Central of Georgia	—	—	—	—	1	1
Chesapeake & Ohio	998	500	—	—	105	1,603
Chicago & Eastern Illinois	—	—	—	11	—	11
Chicago & North Western	—	1	—	—	—	1
Chicago, Burlington & Quincy	110	—	—	1	127	238
Chicago Great Western	175	—	—	1	52	228
Chicago, Milwaukee, St. Paul & Pacific	20	5	—	—	123	148
Chicago, Rock Island & Pacific	—	10	—	50	61	121
Clinchfield	—	10	—	—	—	10
Denver & Rio Grande Western	—	—	—	—	1	1
Duluth, Missabe & Iron Range	20	—	—	—	—	20
Erie	95	—	—	100	—	195
Great Northern	832	260	46	55	54	1,247
Gulf, Mobile & Ohio	—	—	—	1	313	314
Illinois Central	30	—	—	—	—	30
Kansas City Southern	80	—	—	50	—	130
Louisiana & Arkansas	75	—	—	—	—	75
Louisville & Nashville	100	325	—	—	272	697
Mexican Railways	—	11	—	—	—	11
Missouri Pacific	—	1	—	—	—	1
Nevada Northern	—	—	—	—	4	4
New York Central	1	—	—	176	—	177
New York, Chicago & St. Louis	139	12	—	—	—	151
New York, New Haven & Hartford	—	—	—	308	125	433
Northern Pacific	103	—	—	—	750	853
Pennsylvania	220	2	—	1	—	223
Pittsburgh & West Virginia	50	—	—	7	—	57
Reading	150	—	—	—	—	150
River Terminal Ry	—	—	—	17	—	17
St. Louis-San Francisco	410	—	—	—	200	610
St. Louis-Southwestern	100	28	—	—	2	130
Seaboard Air Line	—	—	200	—	300	500
Southern Pacific	200	354	—	181	600	1,335
Southern	1,008	625	101	135	302	2,171
Spokane, Portland & Seattle	—	—	—	—	2	2
Tidewater Southern	—	5	—	—	—	5
Toledo, Peoria & Western	—	1	—	—	—	1
Union Pacific	968	310	—	1	1,243	2,522
Wabash	252	—	—	—	—	252
Western Maryland	2,453	—	—	98	—	2,551
Western Pacific	110	106	100	75	35	426
Total	12,849	6,174	455	1,982	7,742	29,202

Private Car Lines	Hop.	Box	Gon.	Flat	Other
A.C.F. Industries	—	—	—	9	16
American Refrigerator Trans.	—	—	—	—	225
American Steel Foundries	—	3	—	—	2
Burlington Refrigerator Express	—	200	—	—	100
Columbia-Southern	—	—	—	—	3
E. I. du Pont de Nemours & Co. Inc.	—	—	—	—	30
Electro-Motive Division	—	—	—	—	2
Erie Mining	185	—	—	—	—
Ethyl Corporation	—	—	—	—	38
Fruit Growers Express	—	—	—	—	1,809
General Chemical	—	—	—	—	2
General Motors Overseas	—	11	—	—	—
Greenville Steel Car	—	—	—	—	1
Merchants Despatch	—	—	—	—	50
National Cylinder Gas Company	—	—	—	—	6
Pacific Car & Foundry	—	—	—	—	1
Pacific Fruit Express	—	—	—	—	1,000
Petroleos Mexicanos	—	—	—	—	4
Pullman-Standard	—	—	—	—	2
Railway Express	—	—	—	—	500
Republic Steel	—	—	—	—	60
Shippers Car Line	—	—	—	—	15
Sperry Products	—	—	—	—	1
Trailer Train Company	—	—	—	502	326
Union Tank Car	—	—	—	—	10
U. S. Army	—	—	—	7	186
U. S. Navy	—	1	—	—	—
Western Fruit Express	—	—	—	—	160
Total	185	215	—	518	4,541
Non-Interchange Cars					
Alaska	50	1	100	50	20
Atomic Energy Commission	—	—	—	83	—
Iron Ore Co. of Canada	—	—	2,975	—	—
Oliver Mining	—	—	—	—	20
Orinoco Mining	—	64	—	—	559
Quebec, North Shore & Labrador	—	26	—	—	99
Reserve Mining	—	—	—	—	503
Seatrain Lines, Inc.	—	—	—	—	1
Unit Load Car Co.	—	1	—	—	—
Weirton Steel	—	—	—	—	9
Total	50	92	3,075	133	1,211
SUMMARY					
Railroads	12,849	6,174	455	1,982	7,742
Private Car Lines	185	215	—	518	4,541
Non-Interchange Cars	50	92	3,075	133	1,211
Grand Total	13,084	6,481	3,530	2,633	13,494

Freight cars equipped with roller bearings as of December 31, 1957.

cars with 50-in. radius wedges. Other tests are of bearings with raised pads on the back; and the elimination of the optional depressed-back design of bearing is being studied. The Committee is recommending color coding of controlled clearance journal bearings—red for A-1, white for A-3, and yellow for A-5 sizes. A dab of paint of the proper color would be placed on front.

Roller Bearings Popular

Roller bearing freight car ownership jumped by over 8,000 in 1947 and totalled 39,222 cars by year end. Five new greases—one each produced by Gulf, Texas, Sinclair, Shell and Richfield—have been approved for lubricating roller bearings. During this past year the relubrication period for this type of roller bearing was extended from 12 to 18 months and the Committee is now studying the possibility of extending it still further to 36 months. Timken bearings under GM&O and SP cars were checked, and "while leakage did occur, the bearings which were disassembled were in excellent condition after 36 months." Tests on Hyatt and SKF units are now underway.

Lubricators on PRR

H. M. Wood, PRR, said that Committee work with the journal stop should not be used to prolong the use of loose waste, and added that waste was "never satisfactory." He urged that minimum standards be established for journal lubricating devices including requirements for wicking, oil retention, interchangeability and cover characteristics. The Pennsy then suggested a standard of 4.7 pints be adopted for minimum oil retention capacity.

Oil retention is important. PRR laboratory work on 15 lubricating devices shows that oil retention ability varies from 1.36 to 6.85 pints. Four of these 15 devices are on the low oil-retaining side and are not in favor with the PRR. Two of the 12 devices used on PRR cars give the best results, but the general average for pad cars is 699,500 miles per hot box, while loose waste performance is 156,500 mi—a performance four times better. Forty percent of Pennsylvania cars have the two types with the highest oil retention ability (6.85 pint range). These cars operate 2,700,000 miles per hot box and are 17 times better than loose waste. The PRR carries ½ in. of free oil in pad-equipped boxes.

A particularly good test situation is produced by the PRR movement of import iron ore. About 104,000 car loads, 6,000,000 tons, have been moved. There were four pad failures and 301 loose waste hot boxes in this movement. Pad cars handled 23 percent of this movement and had only 2 percent of the hot boxes. Mr. Wood said evaluation of lubricators should be in the toughest service and added that 60 percent of PRR pads are on 70-ton hopper cars.

Lubrication Investigations

Railroad engines and their lubrication are being studied by the Coordinating Research Council, a joint operation of the American Petroleum Institute and the Society of Automotive Engineers. Initiated at the AAR's request, the objective of the project is to determine interdependence of lubricants and different types of engines under a variety of operating conditions. Information has been collected on test techniques. Data on oxidation stability, corrosion, frictional properties, deposit formation and additive depletion has been assembled.

A code for conducting and reporting diesel lubricating and fuel oil tests, Mechanical Research Report No. MR-305 published early this year, establishes uniform test methods reports, so tests conducted by one road laboratory can be interpreted by other roads.

Field tests of lubricating oil in diesel engines are in progress. The committee expects that all tests will be made in conformity with the test manual since its publication. A subcommittee is developing information on unused types of lubricating oil in use or under test by member roads.

Results of several service tests of fuel should be available this summer. A study is being continued on the effects of anti-sludging fuel oil additives but no conclusions are available. Propane as a fuel source was investigated by the committee. It was dropped because of the favorable price differential of propane over fuel oil. The committee believes that propane's advantages are outweighed by its disadvantages. The principal disadvantages are the hazard involved in handling a highly flammable pressurized fuel and the loss of approximately 25 per cent rated horsepower. Advantages appear to be a 28 per cent reduction in fuel cost, low engine wear rates, clean engines and lubricating oil, and no dilution of the lubricating oil by fuel oil.

AB Brake Cleaning Period May Be Extended

Progress reports on cars allowed to operate 48 months without cleaning, oiling, testing and stenciling have furnished sufficient data to warrant extension of the cleaning period. The Committee on Brakes and Brake Equipment has recommended action be taken to extend the periodic C.O.T.&S. of freight brake equipment from 36 to 48 months.

A suggestion made to modify the Interchange Rules to provide that air brake hose five years old or over be removed from

vice did not meet with committee approval. ıny hoses now in use are over ten years l. The major reason for removing hoses m freight cars is because of damage due improper angle cock location. A recent :ck made by an AAR mechanical inspector 1,054 hoses revealed that 57.7 per cent re damaged as a result of improper angle :k location and couplers passing.

Three letter ballot items have been recomnded concerning air-brake hose couplings. e provides a change to permit alternate thods of testing reclaimed couplings and ıke pipe hose assembly including gasket :hout lowering present standards. The :ond provides an alternate test after the :laimed coupling is mounted on a new se. The third recommends that the surfaces the gasket groove and coupling face on w couplings must be cadmium plated at st 0.005 in. thick to reduce corrosion. The mmittee has been working with the AAR :search Laboratory to determine the best :thod of preventing rust and corrosion of se couplings. Various rust preventatives and ıstics have been tested. Aluminum and inless steel ring inserts have also been re:wed.

A letter ballot item has been recommended revise the air hose gasket to include a ad on the back face. The beaded design s proven definitely superior to other forms in laboratory and service tests. Leakage has been reduced under cold weather conditions and in coupling grooves which have become pitted.

The air brake manufacturers have designed additional condemning gages for used "AB" valve parts to establish limit of wear on parts not covered by present gages. The committee has recommended the seven additional gages be submitted to letter ballot.

Basic requirements and limiting dimensions have been established to govern the manufacture of automatic slack adjusters for freight cars insofar as interchangeability is involved. The committee suggests that drawings now available be accepted and instructions be given to permit issue of conditional certificates of approval.

The Joint Sub-committee has recommended to this committee and the Committee on Car Construction that use of the retaining valve be continued on all freight cars. Relocation of the valve has been found desirable, preferably on the side of car. Further investigation will be made, since in some cases a location on the side of car would exceed maximum clearances.

In the question of welding brake pipe in lieu of clamping, the committee believes that welding of pipes to form supports and supports to car structure will meet the requirements of Specification 2518.

New Hand Wheel Standards

The committee on Geared Hand Brakes has developed two designs of hand wheels. One or the other can be properly applied to every model of vertical-wheel hand brake now on the market. Letter ballot action has been recommended on limiting design dimensions for a Deep Type Wheel to be adopted as standard and a Shallow Type as alternate standard. The standard design must be used on all new types of geared hand brakes and intended for use on all existing types where proper clearance can be obtained. The alternate design is intended for use only on existing types of geared hand brakes on which the AAR standard wheel will not provide proper clearance.

One level-type geared hand brake received an AAR Certificate of Approval this year, bringing the approved list total to 36. Letter ballot action was recommended to provide for a more secure fastening of the handwheel and a standard length of hand brake lever.

Journal Finish Standards

The Committee on Axles has recommended as a letter ballot item that machined surfaces of journals in bearing contact areas must be finished to 125 microinches, maximum. The rolled surfaces must be finished to 16

1959 Interchange Rules Will Incorporate Many of These Recommendations

ıese are the principal items recommended the Arbitration Committee and the Comittee on Prices for Labor and Material to be lded to the Interchange Rules. Most will : submitted for letter ballot action.

ule 3, Section c

odification of Paragraph 1 and elimination Paragraphs 5, 6, and 7 and note to iminate obsolete material by specifying Couplers, AAR Standard or AAR Alternate andard required on all cars in interıange. . ."

ule 3, Section f

lodification of Paragraph 3 to require lading rap anchors on all flat cars built since ınuary 1, 1940, because sufficient time has apsed to permit compliance.

ule 3, Section s

ddition of new Paragraph 9 to require that andard mechanical designations be placed n all cars to the right of the nominal apacity. *Also recommended by Operating-ransportation Division.*

ule 3, Section t

lodification of Paragraph 1-d to prohibit ıllied Full Cushion trucks in interchange ecause sufficient time has elapsed to permit ompliance.

ule 3, Section w

lodification of Paragraph 4 and elimination f note to prohibit cast-iron wheels under 0-ton hopper cars in interchange because ufficient time has elapsed to permit removal f such wheels.

ule 16

ddition of new third paragraph to give nformation presently contained in Rule 88 vhich is to be completely deleted. New fourth aragraph would group items of related subects to permit improved indexing.

Rule 17, Section c

Modification of the "Coupler Substitution Schedules" following Paragraph 2 to discourage the use of Type D couplers. Modification of Paragraph 9 to facilitate the removal of riveted-type wrought-iron yokes.

Rule 30

Modification would remove mechanical refrigerator cars from same classification as other reefers with respect to periodic reweighing and re-stencilling requirements. The supplies and fittings to be carried on all cars for the calculation of load limits are specified.

Rule 32

Deletion of Paragraph 11 to avoid conflict with Interpretation 11 pertaining to damage of containers on container cars.

Rule 60

Modification of Section m to provide that mandatory cleaning of AB brake equipment will be performed at 48 month intervals instead of the 36 month intervals now standard. *Recommended by Committee on Brakes and Brake Equipment.*

Rule 65

Modification of rule to add "and journal lubricating devices" to coincide with Interpretation 4 of Rule 66.

Rule 66-A, Section j

Modification of the second paragraph to add five additional types of approved journal roller bearing greases. *Also recommended by the Committee on Lubrication of Cars and Locomotives.*

Rule 88

Elimination of entire rule with information transferred to Rules 5, 16 and 87 to eliminate obsolete material, simplify the rules, and consolidate provisions pertaining to repairs of foreign cars in one rule.

Rule 95

Deletion of fifth paragraph and modification of sixth and seventh paragraphs to discourage the use of Type D couplers.

Rule 101

Modification of 17 item in "List of AAR Approved Equivalent Brake Beam Safety Supports" to provide for modified support for spring-plankless trucks. *Also recommended by Committee on Car Construction.* Modification of Items 45-B, 45-C, 54-M to clarify intent, and modification of Items 211, 212 and 213 to provide for credit for No. 2, 3 and 15 brake beams removed when defective.

Rule 112

Modification of Paragraph 1-d of Section A and Paragraph 1 of Section J to provide a more adequate allowance for scrap based on present day values.

Rule 120

Modification of Paragraph g to provide a more adequate allowance for scrap based on present day values and pertaining to material in destroyed or badly damaged cars.

Passenger Car Rule 7

Modification of Paragraph j-1 pertaining to cleaning of air brakes on passenger cars to indicate that on D-22 air brakes, the displacement reservoir diaphragm need not be removed and inspected. *Also recommended by Committee on Brakes and Brake Equipment.*

microinches, maximum. The Committee on Wheels concurs in this action.

Summary of Research Center Report MR-290 covering the economic analysis of overheated journals shows that arbitrary scrapping of all axles with overheated journals would cost five million dollars annually, based on depreciated service life. The report recommends that both magnetic particle and ultrasonic testing be required before returning such axles to service, citing cases of undersurface defects not detectable by magnetic particle testing or surface defects so shallow as to go undetected during ultrasonic testing. The study continues.

No conclusions have been reached in tests to determine the fatigue effects, if any, of scalloping at the wheel fit junction with the "as forged" portion of the axles on alternate standard, raised-wheel-seat, freight axles. There have been no such failures, and preliminary tests show these axles will fail from fatigue at sections other than in the scalloped area. A letter ballot item recommends that the maximum scalloping over the peaks at either end of these axles shall not exceed two inches, and the combined scalloping of the two ends shall not exceed a total of three inches.

Fatigue tests of diesel locomotive axles are continuing and will be given priority over roller bearing journal tests, or the two will be run concurrently if possible. Further investigation of the cause and effects of copper penetration are being made. Analysis of seven cold break journals revealed no actual intergranular penetration. While copper penetration is recognized, actual temperature, stress, and bearing copper content at the time of overheating has not yet been determined.

Methods of inspection of cracked axles are continuing. Only the wet magnetic particle method will be used, since deficiencies have been found in the dry particle method. An ultrasonic device will then be used for defects not found by the wet method.

The Committee on Wheels is continuing to follow developments in ultrasonic inspections of axles under freight cars and of diesel wheels at manufacturer's plants. Reports from railroads show one defective axle is detected by the use of mobile test units out of every 400 cars checked. As of December 31, 1957, 18,005 ultransonically inspected wheels had been ordered by the railroads, and their performance is being followed.

Standard Wheel Contour

The committee recommends serious consideration be given to the consolidation of steel wheel tread and flange contours. This would standardize one contour for multiple-wear wrought-steel wheels, one-wear wrought-steel wheels, one-wear cast-steel wheels and steel-tired wheels. The wrought-steel wheel manufacturers would benefit in maintaining one instead of two designs of rolls for tread and flange contour. Railroads could eliminate different styles of wheel acceptance and wheel mounting gages.

The committee has determined that cast steel wheels, Types A and B, having defects such as slid flats and built up treads can be reclaimed. Turning is done at speeds comparable to those for one-wear, wrought-steel wheels. Carbide tools are successfully used and can be reclaimed by the normal grinding procedure. The wheels must be carefully inspected to determine the extent of damage and whether reclamation is economically justified. In restoring the contour, the apex of the flange should not be disturbed.

Wheel and Axle Manual

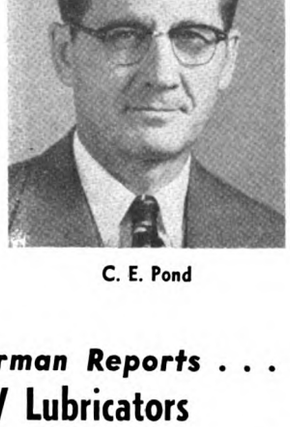
The completely revised edition of the Wheel and Axle Manual to be effective January 1, 1959, will consolidate the present twenty-one sections into seven with related sub-sections. Bolder type will be used. Section XX—Mandatory Rules Governing Wheel Shop Practices—will become Section 1. It will be printed on colored paper.

Recommended letter ballot items include change in Rule 355 (e) establishing an entering taper on wheel seats consistent with the size of axle; change in Rule 355 (o) to make mandatory the wet method of magnetic particle testing for locating surface induced defects in axles rather than the dry powder method, and modification of Par. 363 (e) to provide that journal protective coating be only to be applied to wheel sets just mounted, mounted wheels in storage, and those in transit for application.

Reconditioned Draft Gear

The Committee on Couplers and Draft Gears has recommended a letter ballot item revision of Specification M-901-B to provide a test for capacity of each reconditioned draft gear instead of 20 per cent of any lot of gears. If any gear fails to pass the test, it must be reworked and retested. An alternate simplified test can be used where no other information is required other than to determine if the gear passes the specification requirements.

In testing reconditioned draft gears at shop and reclamation points, the AAR Research Center has concluded that the 9,000-lb free fall vertical tup is less costly and the most satisfactory means that can be used.



C. E. Pond

Chairman Reports . . .
N&W Lubricators Perform Three Times Better

C. E. Pond, chairman of the Mechanical Division and general superintendent motive power of the Norfolk & Western, told of his road's experiences with lubricators and discussed other experiments being carried on with the solid bearing assembly.

Norfolk & Western has 50,631 cars fitted with lubricating pads—81.5 percent of its freight car fleet. All cars were to have them this year but recession has delayed the program. Over 29 months, pad cars operated an average of 3,186,494 miles per set off and waste-packed cars 1,072,006 miles—a ratio of three to one.

Pads are serviced at two major points. Coal loads moving to the East coast are serviced at Bluefield, W. Va., for 825 mile round trip which finally takes them empty to the mines and under load back to Bluefield before additional servicing. A similar practice at Williamson, W. Va., readies coal loads for 775 mile trip to Great Lakes ports and back to mines. This contrasts with hooking and servicing of waste-packed boxes about once each 100 miles.

"There is still room for improvement in the various type pads," Mr. Pond continued. "The wicking characteristics of the pads in cold weather are far from satisfactory. In each of the three winters we have been operating pads, there have been two or three months when the waste packed mileage was higher than the pad mileage." AAR Mechanical Division is working up a specification for lubricators which will include a cold wicking test.

Since the lubricator pad program started, oil consumption has climbed. From 1932 to 1954, one gallon of car oil was used each 1,620 freight car miles. From 1954 to date, the average has been 720 miles per gal. The Lubrication Committee is studying the proper oil level to be carried and this can help. If lubricator has free oil passages from end to end, it will waste more oil, Mr. Pond warned.

N&W operates 500 70-ton hoppers with controlled-clearance bearings, 50-in. wedges, pads, journal stops, good dust guards, and lid seals. Six months service shows the oil is being retained. "While results are encouraging," Mr. Pond reported, "there is some question if the railroads can afford to apply all these refinements to the conventional journal box assembly."

On 100 70-ton hoppers, flat-back controlled-clearance bearings, 50-in. wedges, pads, and good front and back seals are being used to see if the greater contact area of the flat-back bearing will prevent movement of the journal relative to the box enough to protect the back seal. They are showing no oil on the wheel plates so far.

On 200 new 70-ton hoppers N&W is going to compare AAR standard bearing with pre-war designs—both with and without center loading pads. This will attempt to produce uniform loading through the length of the journal.

Reclamation is being done successfully on lubricator pads. Plants at Roanoke, Va., and Portsmouth, Ohio, have reclaimed over 82,000 pads and scrapped about 6,000—7.3 percent. Some progress has been made at salvaging damaged pads. This damage is usually due to the use of packing irons and to rough axle collars and fillets.

"We have thought the freight car oil specification needs revision. . . Tests disclose that better results can be obtained with two grades of car oil rather than one," Mr. Pond stated. "The winter grade oil should have a viscosity of 44 to 46 and the summer grade from 68 to 70 sec at 210 deg F."

"I urge member roads and private car lines to accelerate the application of lubricating devices," Mr. Pond concluded, "so all railroads can effect savings in hot boxes and servicing costs."

Tooling Up . . .

"Now wait a minute, Jim," Pete stopped him, "those little cans of Freon we carry in stock are not good enough."

E MORNING early, our friend, Pete, lked into the office where Big Jim, boss, was busy at his desk. "Jim," e began, "I've been thinking that if 're to continue trouble shooting and rking these mechanical refrigerator s, we should have some special tools d supplies." Still fresh in Pete's mind s a midnight session with a mechan- l reefer failure only two days before. Jim looked up from his work but ln't answer for several seconds. "It's ssible," he finally replied, "but just at did you have in mind? Sit down, te, and let's talk this over."

"Jim, all these reefer systems use eon as a refrigerant. It changes from iquid to a gas and back to a liquid," te explained. "This is done by a ange of pressure and transfer of heat. tell how such a system is doing, these essures should be known. A pair of t gages mounted on a gage manifold th three hoses is one outfit we do ed. One of the hoses is used to con- ct to the refrigerating system, the sec- d for connecting the gages, and the rd to add more Freon through that t gage manifold.

"Refrigeration wrenches are the only ols that should be used on this equip- ent. To try to use adjustable wrenches, worse yet, other types of tools on frigeration fittings will ruin the fittings no tool will work on them. Then, te continued, "we should also have a alide leak detector, a torch-like gadget th a snifter tube. There are two mod- available. One is an alcohol torch d the other gets its fuel from a small opane tank. This is used for locating aks in refrigeration systems."

Big Jim broke in at this point. "Pete, you really think we need all of that uff?"

"Sure, Jim," Pete answered. "I am rtain that these are things we ought have. We should, that is, if we are to do any good at all. Two other things we should have are a clamp-on ammeter and a cycle meter."

"But, Pete," Jim interrupted, "we have a clamp-on ammeter!"

"We do? I haven't seen it."

Jim told him that one of the gangs had one and used it regularly. It would be available. "But now," he continued, "what do we need a cycle meter for?"

"If you will remember, Jim, most of these refrigerator cars have the diesel engine driving an alternating current generator. This power is then used to drive all the other equipment. The speed of the diesel determines the number of cycles that the alternator puts out. If the engine speed is low, the cycles are low; if the speed is high, then the cycles are high. In alternating current machines, low voltage and low frequency may not permit motors to start readily. Resulting overloads can trip circuit breakers causing car failures. If we have a condition where the circuit breakers are tripping, we should know that it isn't low engine speed," Pete concluded.

"Couldn't we use the tachometer that we already have?" Jim asked.

"We could," Pete replied, "but it is not easy to apply a tachometer to some of these small engines."

Jim wrote down the cycle meter, but put a question mark behind it and then said, "Is that all we need?"

"For the time being that will give us the tools we need for trouble shooting. If we have to start maintenance of these mechanical reefers, then we will have to get some other tools. As for supplies, Freon-12, refrigerant oil and permanent antifreeze should be available."

"We keep Freon on hand," said Jim. "We have antifreeze here in the winter but not during hot weather."

"Now wait a minute, Jim," Pete stopped him. "Those little cans of Freon we carry in stock are not good enough. Some of these mechanical refrigerator cars take as much as 75 lb of refrigerant. And as for the antifreeze, these cars use it year 'round. It is a 50-50 mixture to prevent corrosion, pitting and scaling of the engine's cooling system. It has to be mixed before it is put in—a quart of antifreeze and a quart of water or a gallon of antifreeze and one of water."

"OK, Pete. Now what about this refrigerant oil? Why would we need that?"

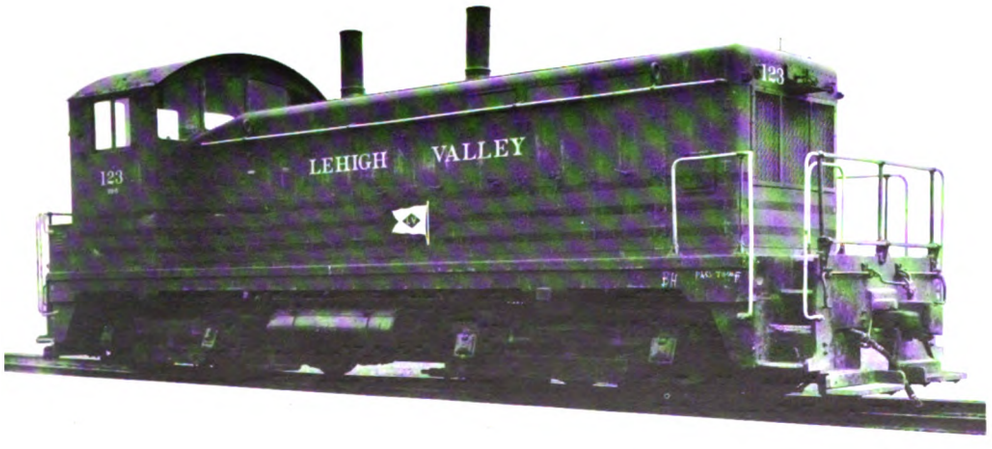
Pete pointed out that the compressor has its own lubrication system. It is a closed system and actually no oil is ever lost or used except when a Freon leak occurs. When this happens, both the Freon and oil are lost. "Whenever refrigerant must be added, oil is added along with the refrigerant," Pete concluded. "The Freon then carries the oil with it throughout the system."

The two talked some more about equipment and supplies and how they should be ordered. Jim stated that more of these cars were being built; more would be running on their line, and more and more frequently they would be called upon to do work on them. Finally, he asked if Pete wouldn't help by holding a short class session about once a week so that everybody would have the background for work on these cars.

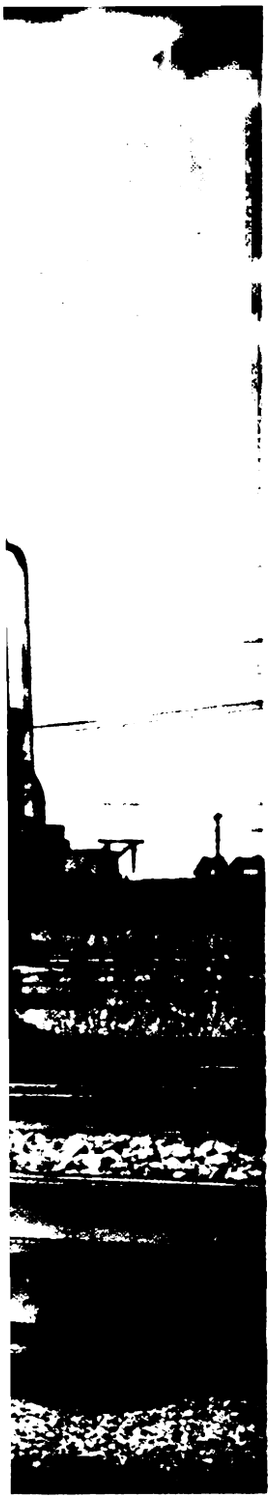
"That does it!" Pete grumbled. "Try to help you out and you give me more work! I don't know enough to teach anybody."

"Now look, Pete," Jim said, "you have taught me quite a bit in these few minutes we have been talking. Maybe you don't know all of it, but you know more than the rest. If we all get our heads together and study together, we'll all gain. You will, too. Now, what do you say?"

"Oh, all right! You won't let me rest till I agree with you," Pete conceded. "Have you got any equipment manuals that I can study?"



Above is one of the switching locomotives the Lehigh Valley has received through its power renewal program. Unit replaces 20-year-old switcher shown at left.



New locomotives for old . . .

The Lehigh Valley, through a planned program of power renewal, is acquiring a new switching fleet by turning in twenty-year-old locomotives on the purchase of new locomotives that contain certain remanufactured components.

Under this program, old locomotives are turned in one or two at a time. New Power is thus acquired gradually with minimum out-of-service time.

Many roads are taking advantage of the value in their old freight, passenger, and switching locomotives by acquiring more efficient and more powerful Diesels, equivalent of today's production standards. For details, call your Electro-Motive representative.

GENERAL MOTORS LOCOMOTIVES

ELECTRO-MOTIVE DIVISION
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LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*

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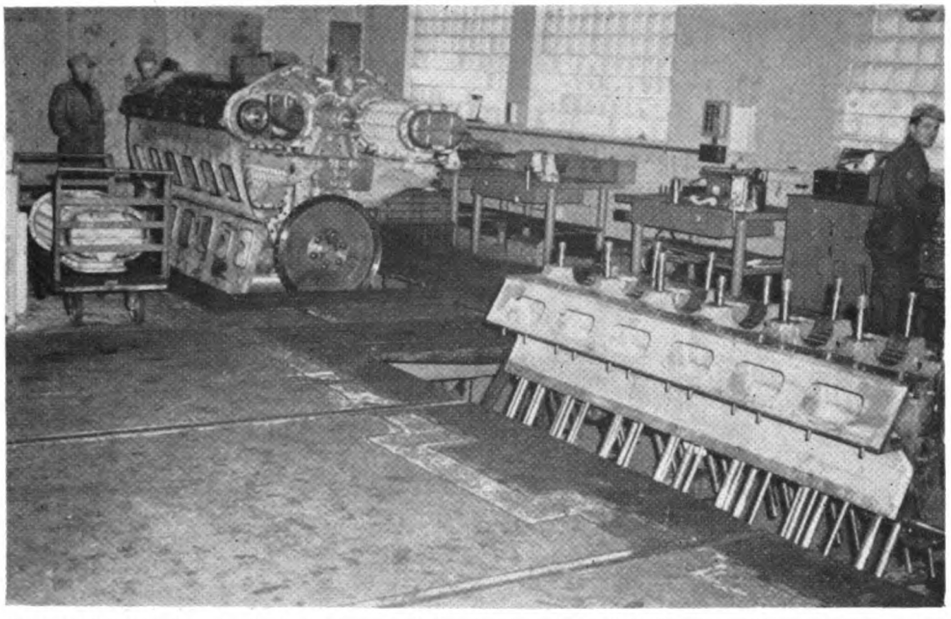
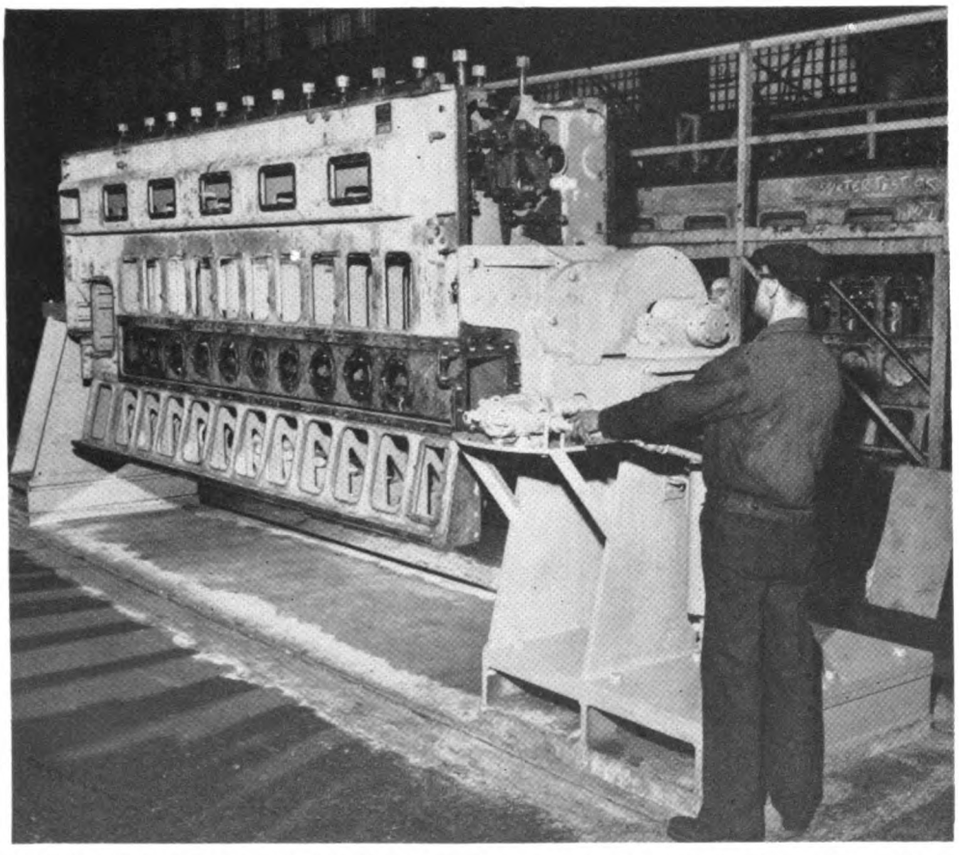
DIESEL REPAIR TIME-SAVERS

Positioning Crankcases

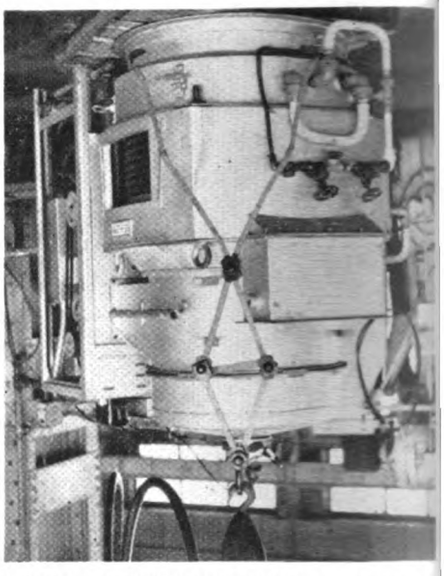


UNION PACIFIC has six pits in its Omaha, Neb., diesel engine rebuilding shop. These are arranged so that the base of the engine can be positioned at any location from floor level to 4-ft 3-in. below. This simplifies stripping and assembly.



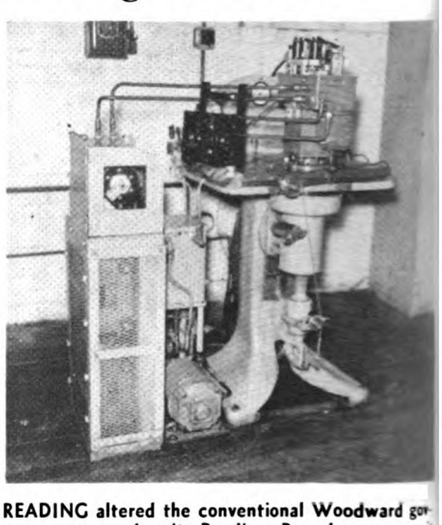
PENNSYLVANIA designed and installed this Fairbanks-Morse engine-frame turning device at the Altoona, Pa., shop. Frames can be rotated to any position for installation of components. This has made it unnecessary to use the overhead cranes, making it possible to do the work faster and with greater safety.

Lifting Generator Coils

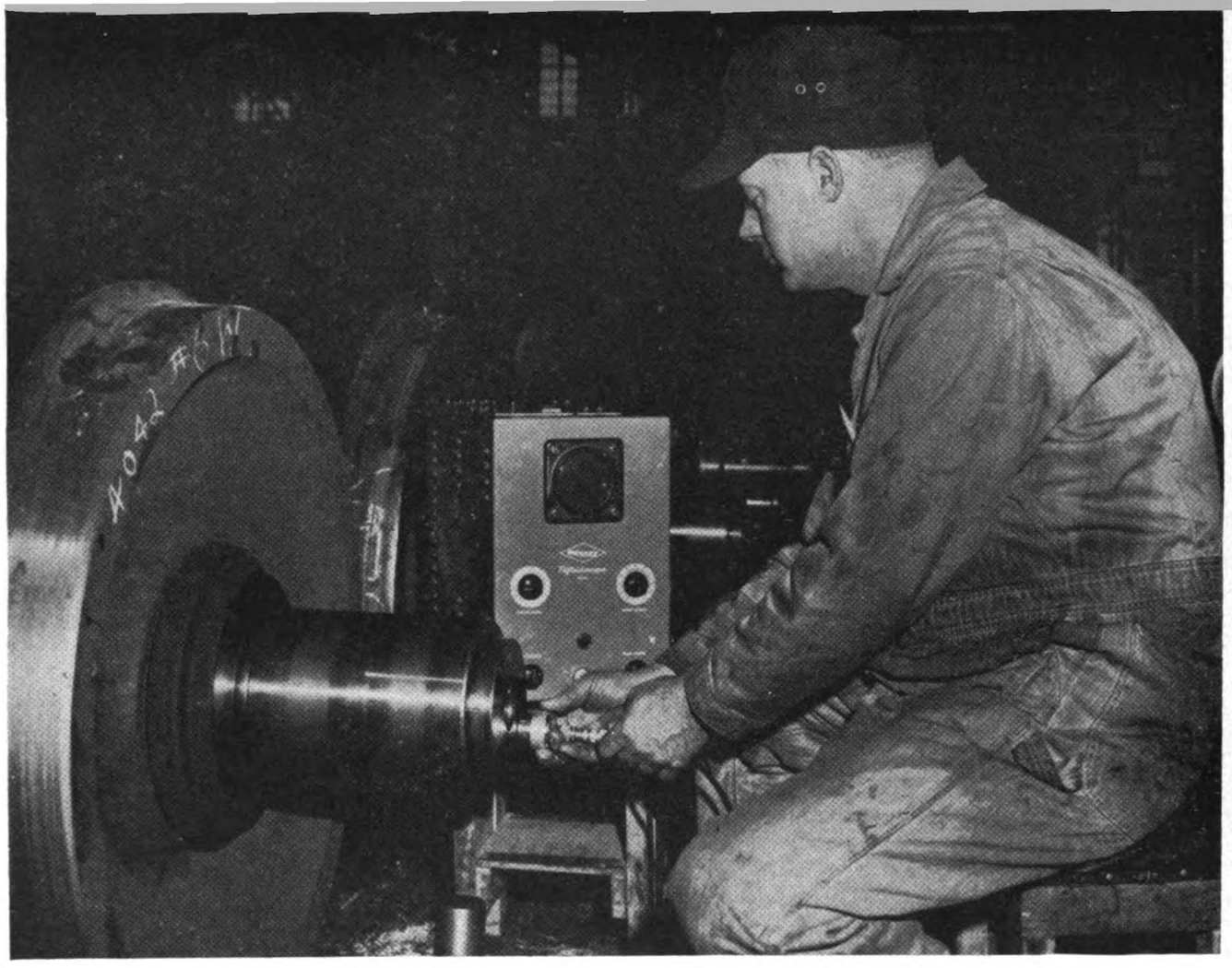


CHICAGO & EASTERN ILLINOIS uses this toggle-jointed coil lifter at its Danville, Ill., shop. The device is made of 5/8 by 3/4-in. steel. It removes the outer, intermediate, and inner steam generator coils for repair. The positive clamping action on each coil nest makes this device superior to the two-hook chain formerly used. It is easily operated by one man.

Testing Governors



READING altered the conventional Woodward governor test stand at its Reading, Pa., shop to permit complete testing. A small tank equipped with a 110-volt immersion heater supplies oil at about 190 deg F. While the governor is being set, the oil is circulated with a standard locomotive fuel pump. Setting with warm oil makes it possible to install these governors on locomotives with little subsequent adjustment. Power piston operation is checked by coupling its oil lines to a standard EMD load regulator installed beside the test stand. Calibration of the low oil shut-down is checked by bleeding off oil pressure developed by the fuel pump through a needle valve. The pump is now driven by a 110-volt a-c motor instead of the original 74-volt d-c type. Governor oil suction shut-down is tested with a line coupled to the suction side of the fuel pump.



New SPERRY REFLECTOSCOPE cuts time and cost on axle testing

Designed specifically for railroad use, the Type US Sperry Reflectoscope offers a faster, simpler, more accurate and more economical means of testing. Axles can be tested "in place" on locomotives or cars, resulting in major maintenance economies by detecting hidden flaws before they cause costly failures or breakdowns.

The Sperry Reflectoscope offers these advantages:

Complete portability... weighs only 35 pounds

Low power consumption... built-in voltage regulation

Simplified four-knob control panel

New, completely transistorized plug-in alarm system... eliminates possibility of human error

Bright . . . easy to read video presentation

Sperry Reflectoscope Type US is another fine example of Sperry Rail Service's "engineering exclusively for railroads." If you're interested in cutting maintenance costs and achieving maximum equipment utilization, send for details of this outstanding inspection tool.

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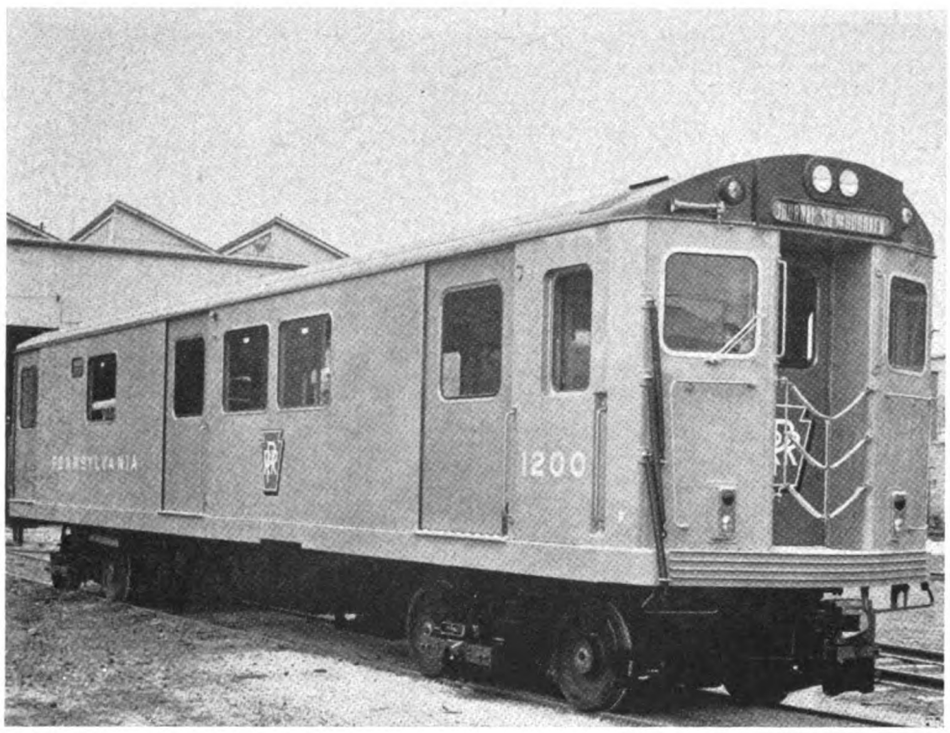
ELECTRICAL SECTION



First of the 50 air-conditioned cars which will have gray bodies and blue doors. Only 30 carrying PRR emblems will have cab signal equipment.

Partial List of Suppliers

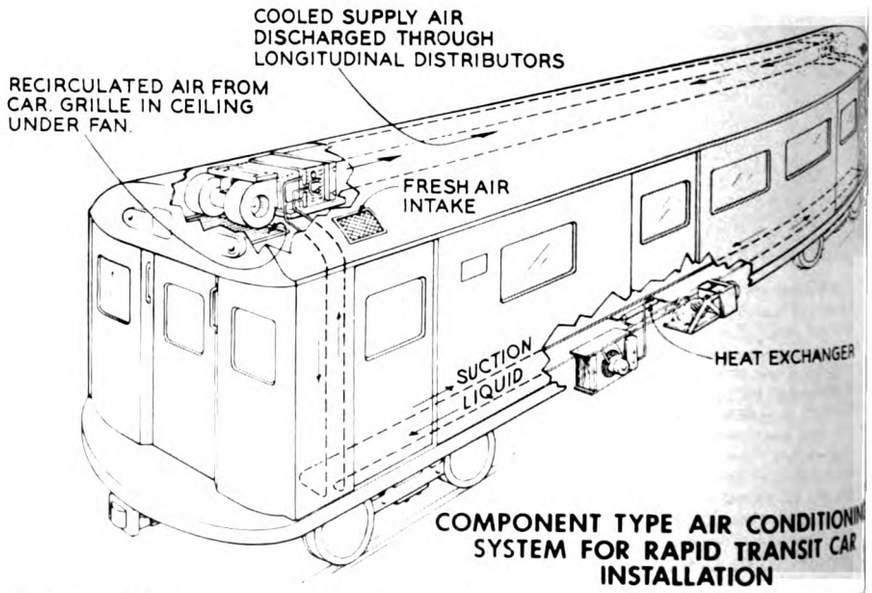
Axles and wheels	U. S. Steel Corp.
Journal bearings	Timken Roller Bearing C.
Shock absorbers	Houdaille Industries
Traction motor drive	Spicer Div., Dana Corp.
Truck frames	General Steel Castings C.
Truck springs	Crucible Steel Co.
Body insulation	Gustin-Bacon Mfg. Co.
	Owens-Corning Corp.
Doors	O. M. Edwards Co.
Floor tile	Armstrong Cork Co.
Headlining	Formica Co.
Paint	Sherwin-Williams Co.
Seats	Heywood-Wakefield Co.
Seat covering	DuPont Co.
Seat cushions	Goodyear Co.
Steel sheets	Armco Steel Corp.
Steel trim, stainless	Rigid Metals Textured
Window sash and hardware	Adams & Westlake Co.
Air brakes	Westinghouse Air Brake C.
Brake shoes	Railroad Friction Product
Couplers	Westinghouse Air Brake C.
Draft gears	Waugh Equipment Co.
Hand brake	National Brake Co.
Air conditioning	Safety Industries, Inc.
	Trane Co.
Air conditioning and heating controls	Vapor Heating Corp.
Heaters	Railway Utility Co.
Batteries	McGraw-Edison Co.
Lamp regulator	Safety Industries, Inc.
Light fixtures	Electric Service Mfg. C.
Head lights	Pyle-National Co.
Traction motors, controls, wire and cable	General Electric Co.

First Air-Conditioned Transit Car Fleet

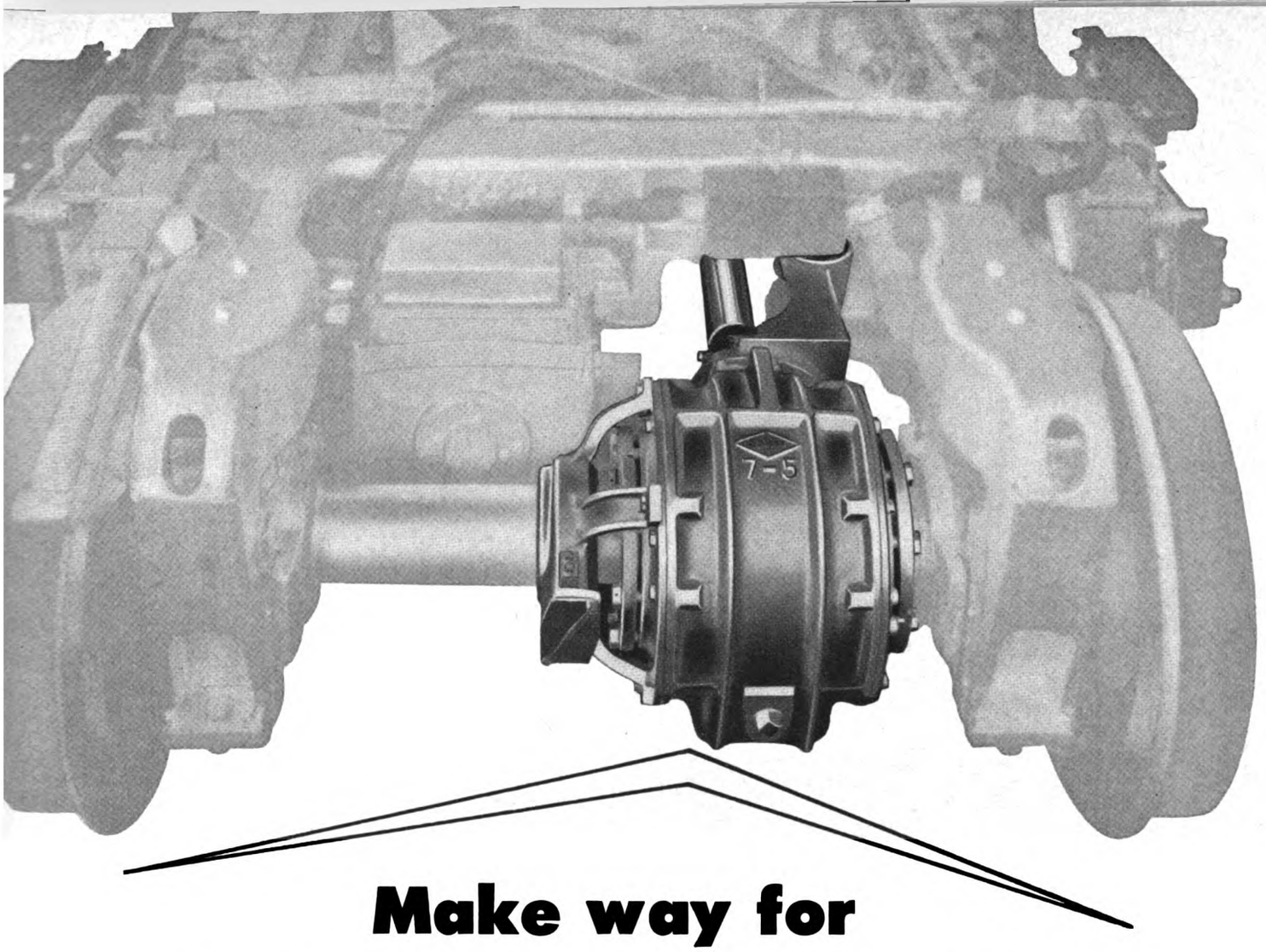
DELIVERIES of 50 air-conditioned, rapid-transit cars for the New York City to Newark, N. J., operation of the Hudson & Manhattan Railroad are now under way. With these new St. Louis-built units, this line will become the first transit service exclusively operated with a fleet of air-conditioned cars.

The introduction of new equipment coincides with the 50th anniversary of the road's opening. The H&M (popularly known as The Tubes) connects two New York terminals with the New Jersey cities of Hoboken, Jersey City, and Newark. In Jersey City, Hoboken, and New York this is a subway operation. On the nine-mile Newark run, trains operate on a Pennsylvania Railroad surface line after leaving Jersey City. This Newark-New York operation serves as a downtown New York connection for Pennsylvania trains from the south and west. Thirty of the 50 new cars are owned by the Pennsylvania, and 20 by the operating company—the Hudson & Manhattan.

Because of the H&M bankruptcy, purchase of the new cars was the subject of a study authorized by the Federal District Court. When the court ordered the trustee to solicit bids for this equipment early in 1956, it also directed a firm of consulting engineers



This Safety Industries component arrangement, with duct type air distribution, was utilized on a
and H&M cars.



Make way for Lightweight Design with Spicer Traction Motor Drives

Spicer Traction Motor Drives play an important part in reducing the cost and weight of the newest self-propelled Rapid Transit cars being produced by the Pullman-Standard Company. 50 of the new cars are already in service for the Metropolitan Transit Authority of Boston, Massachusetts.

These cars employ high-speed, lightweight motors which are coupled by Spicer high-speed propeller shafts to Spicer Traction Drives. The drive permits the application of inboard bearing trucks which provides weight and cost saving features.

The Spicer Traction Drive permits maximum acceleration through a single set of gears with optional ratios to match train schedules ranging from 5.88 to 1 up to 8.9 to 1.

To insure maximum performance, the Spicer assembly is delivered complete — ready to be secured on the axle. No further adjustments are necessary, for each set of gears has been mated, factory-adjusted and tested under actual running conditions.

If you're interested in cost and weight savings, as well as maximum efficiency from railway traction drives, write for the latest Spicer Technical Bulletin. The address is Dana Corporation, Toledo 1, Ohio.

DANA CORPORATION • Toledo 1, Ohio

DANA PRODUCTS Serve Many Fields:

AUTOMOTIVE: Transmissions, Universal Joints, Propeller Shafts, Axles, Powr-Lok Differentials, Torque Converters, Gear Boxes, Power Take-Offs, Power Take-Off Joints, Clutches, Frames, Forgings, Stampings.

INDUSTRIAL VEHICLES AND EQUIPMENT: Transmissions, Universal Joints, Propeller Shafts, Axles, Gear Boxes, Clutches, Forgings, Stampings.

AVIATION: Universal Joints, Propeller Shafts, Axles, Gears, Forgings, Stampings.

RAILROAD: Transmissions, Universal Joints, Propeller Shafts, Generator Drives, Rail Car Drives, Pressed Steel Parts, Traction Motor Drives, Forgings, Stampings.

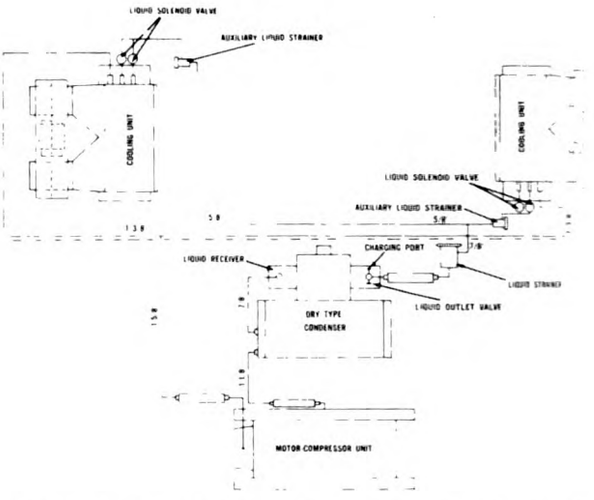
AGRICULTURE: Universal Joints, Propeller Shafts, Axles, Power Take-Offs, Power Take-Off Joints, Clutches, Forgings, Stampings.

MARINE: Universal Joints, Propeller Shafts, Gear Boxes, Forgings, Stampings.

Many of these products manufactured in Canada by Hayes Steel Products Limited, Merritton, Ontario

DANA Spicer

Air-conditioned interiors are colorful. Formica ceilings are pearl gray. Individual cars are finished in one of three basic color schemes: blue, turquoise and aqua, or coral and rose. Air enters through two Safety continuous ceiling-mounted diffusers.



Installation with Trane equipment involves compressor driven by 12 motor, air-cooled condenser with fan powered by 1.5-hp motor, and separate evaporator units each having two fans mounted on double extensions of ¾-hp motors.

studies of continuing the joint H&M-PRR service and of the purchase of new cars.

A favorable report led to the order for 50 cars from the St. Louis Car Company late in 1956. H&M expenditure was to be $1,700,000 for its 20 cars, and the Pennsylvania authorized $2,600,000 for its 30 units. To make service on this run as attractive as possible, it was decided that the new cars would be air conditioned. This had already been studied with successful test installations on two existing H&M cars in 1956 (*Railway Locomotives and Cars,* March 1957, p. 56).

Car Design

The new cars are of the PCC rapid-transit type based on TRC design and modified to meet ICC strength requirements. Buffing strength of 400,000 lb was checked at the AAR laboratory in Chicago by testing the first car. The design and size of these cars make them similar to units recently placed in service by Chicago and Boston transit systems. Overall length is 51 ft 3 in.

The cars are built of Armco HT50 low-alloy, high-tensile steel, and the two-cab models weigh 69,300 lb. Ten have two cabs, making them capable of single-unit operation. The other 40 single-cab cars are to be assembled in 20 semi-permanently coupled pairs. One car of each two-unit set will have the Westinghouse compressor for both cars, and the other will carry the motor-generator set and the Edison battery for the pair.

Up to eight cars can be operated in multiple unit. Waugh rubber draft gears and Westinghouse Air Brake H-2-C automatic couplers with integral air connections are used throughout. Control jumpers will be used only between the cars of the two-unit sets, because the couplers at the cab ends of all cars will have integral, electric train-line connections.

Each car is powered with four General Electric 100-hp, longitudinally-mounted, transit motors which drive through Spicer right-angle, hypoid-gear units. Acceleration is 2.5 mph per sec; and maximum speed is 60 mph. Trucks are of General Steel's transit design with inboard, 5-in. x 9-in. Timken roller bearings; 28-in. cylindrical tread, wrought-steel wheels; and coil-spring suspension. Wheel base is 6 ft 10 in. and truck center distance is 33 ft.

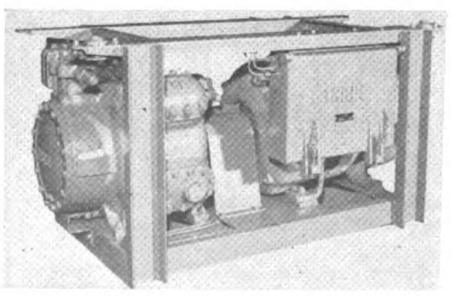
A Westinghouse Air Brake SMEE electro - pneumatic, variable - load, straight-air brake system with ME-42 brake valve operates in conjunction with dynamic motor braking to produce a maximum deceleration of 3 mph per sec. An individual Westinghouse, package tread-brake unit with Cobra shoe is applied to each wheel.

The cars are designed to seat either 44 or 46 passengers and accommodate a maximum of 152. Instead of being directly opposite each other, side door openings are staggered to facilitate rapid loading and unloading. The sliding side doors have electric door engines.

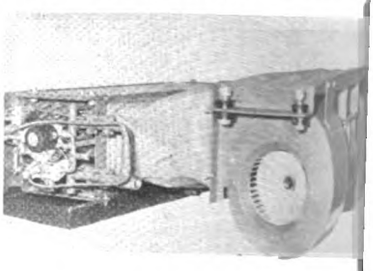
Cleaning has been simplified and terior repainting virtually elimina with this car design. Ceilings and w dow sills are integrally colored Form Scuff plates, handholds and trim stainless steel, and the floors color vinyl-asbestos tile. The longitud seating is upholstered in vinyl-plas Fabrilite over foam-plastic cushio Two rows of ceiling-mounted incand cent lighting fixtures illuminate the teriors. Passenger compartment windo are fixed, single-pane Adlake units tractive pastel color combinations used throughout the interiors.

Air Conditioning

Air conditioning of rapid transit c is not a simple problem. The side d opening area, the frequent stops, the high passenger load make it nec sary to provide much greater cool capacity than would be needed more conventional railway equipment comparable size. Rapid changes in pa senger loads and the combination above-ground and tunnel operation du plicate temperature control problem Nominal 600-volt d-c third-rail volt which actually swings between 450



Compressor units mounted under PRR cars have four-step unloaders for automatic capacity modulation.



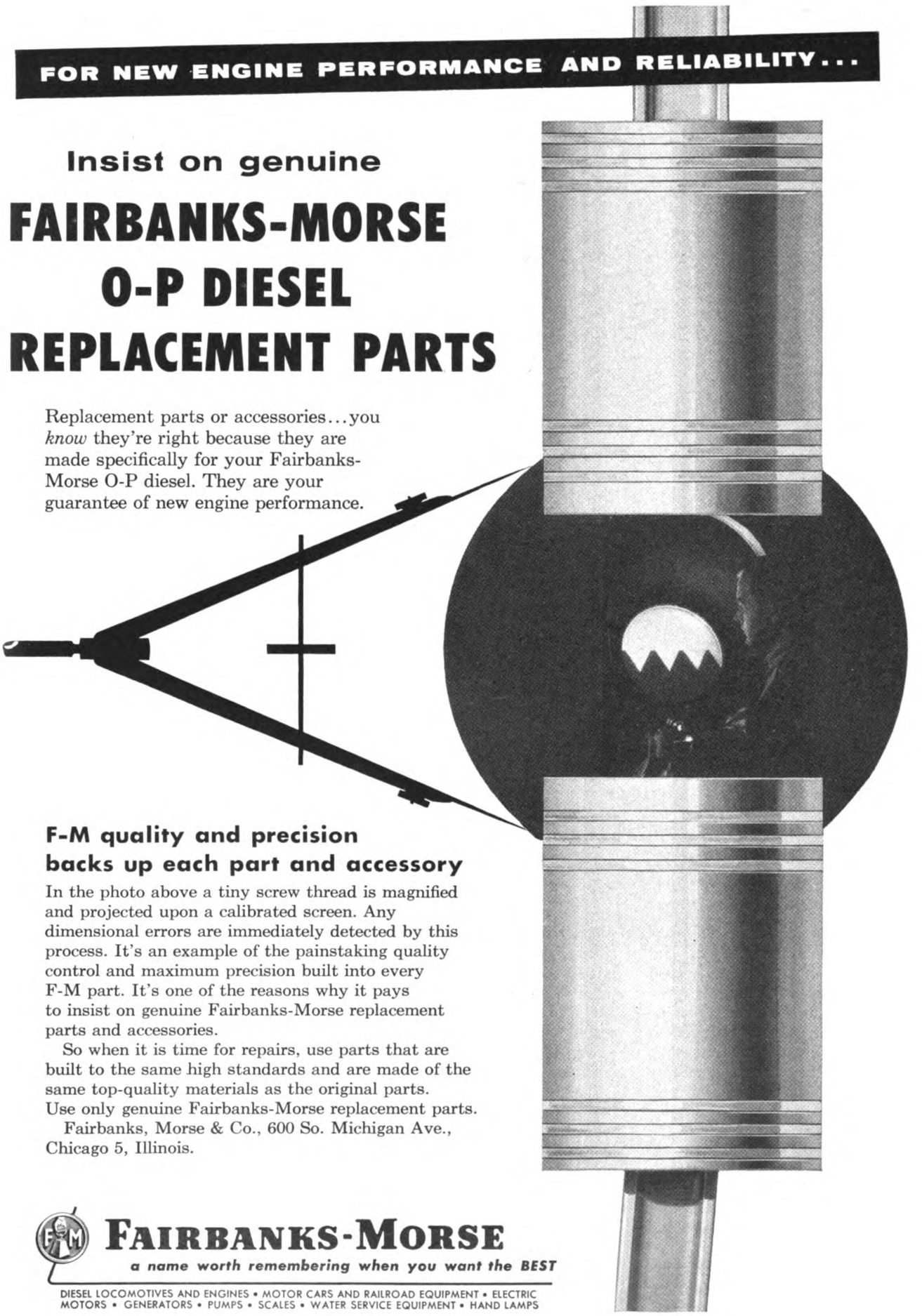
Two of these Safety Type ACMX overhead orator units, each with a capacity of 4.5 ton used on each H&M car.

FOR NEW ENGINE PERFORMANCE AND RELIABILITY...

Insist on genuine

FAIRBANKS-MORSE O-P DIESEL REPLACEMENT PARTS

Replacement parts or accessories...you *know* they're right because they are made specifically for your Fairbanks-Morse O-P diesel. They are your guarantee of new engine performance.



F-M quality and precision backs up each part and accessory

In the photo above a tiny screw thread is magnified and projected upon a calibrated screen. Any dimensional errors are immediately detected by this process. It's an example of the painstaking quality control and maximum precision built into every F-M part. It's one of the reasons why it pays to insist on genuine Fairbanks-Morse replacement parts and accessories.

So when it is time for repairs, use parts that are built to the same high standards and are made of the same top-quality materials as the original parts. Use only genuine Fairbanks-Morse replacement parts.

Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

DIESEL LOCOMOTIVES AND ENGINES • MOTOR CARS AND RAILROAD EQUIPMENT • ELECTRIC MOTORS • GENERATORS • PUMPS • SCALES • WATER SERVICE EQUIPMENT • HAND LAMPS

700 volts, makes the successful operation of motors a problem.

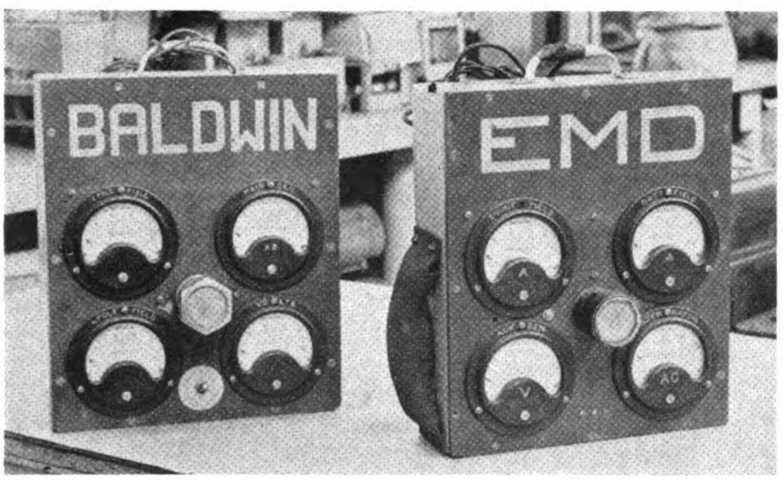
The 10-ton systems installed on the new H&M equipment are made up of components much like those found on standard railroad passenger cars. The motor-driven compressor and condenser are located under the car body. Two overhead evaporator-blower assemblies feed from both ends into a duct running the length of the car ceiling and split diagonally so each cooling unit delivers some air through the entire car body. This equipment weighs approximately 2,500 lb.

Each evaporator cooling coil is split horizontally into two sections, and each section has its own expansion valve and solenoid liquid valve. Each cooling unit also has an electric heating section which is also split into two sections. This overhead heating system is supplemented with 20 panel-type floor heating elements, mounted under the seats, with maximum capacity of 13,500 watts. Cooling and heating controls are supplied by Vapor Heating Corporation.

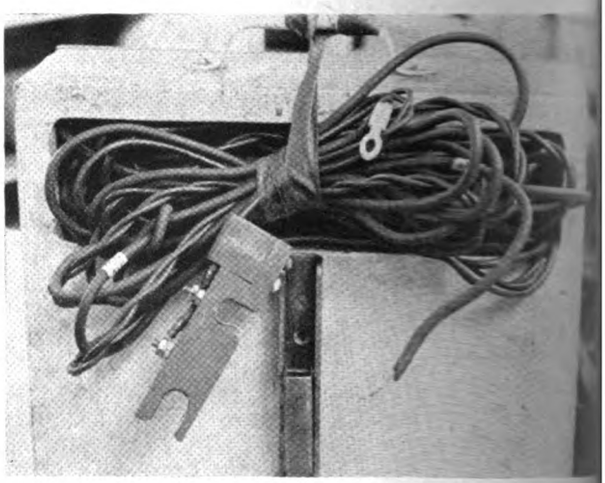
The solenoid liquid valves of the two upper cooling coil sections are opened when car temperature reaches 76 deg F and cooling begins. If the temperature reaches 78 deg F, the lower sections are brought into use. This process is reversed as car temperature goes down.

Each overhead unit provides 1,500 c total air flow, or 3,000 cfm for the c This is a mixture of 1,200 cfm of filte outside air and 1,800 cfm of filte recirculated air, making a comple change of air at least once each minu There are exhaust grilles, but no exha fans because the system is designed pressurize the car body slightly. Th means that air will be exhausted throu open doors at stops, and will preve outside air from entering the car.

Tests indicate that a system of th type will provide temperature and hu midity control for all passenger loa and for both tunnel and surface or el vated operation.



Two of the three portable meter boxes used in making engine-generator load tests on diesel-electric locomotives.



Rear view of one of the meter boxes. Special polarized meter terminals prevent incorrect application of meters.

Meter Boxes Aid Load Tests

WHEN LEAD TESTS are made on overhauled diesel locomotive engines and generators, it is necessary to record voltage and current output of the generator in order to determine engine performance. It is also desirable to make a number of meter readings such as generator field current, auxiliary generator voltage, battery field current, etc.

When such tests are made in the Glenwood Shop of the Baltimore & Ohio at Pittsburgh, the generators are loaded on General Electric portable resistors. These are equipped with an ammeter and a voltmeter to show the total load.

It has been the practice to use portable instruments to make the other readings, but difficulties are encountered doing it this way, in that the meters are subject to damage in handling, and sometimes are applied to the wrong circuit, with the result that the meter is destroyed. Furthermore, each of the three different makes of locomotives which are tested at Glenwood requires certain specific meters, and it was necessary to select the correct meter for each test.

To take care of this situation, a meter box was made for each of the three types of locomotives. Two of them are shown in the illustration, the one on the left for Baldwin, and the one on the right for EMD locomotives.

The meter at the upper left in the Baldwin box is a 0-15-amp d-c ammeter for measuring 2-pole field current. The one at the upper right is a 0-50 millivolt d-c meter which, with a shunt, measures main generator current. At the lower left is a 0-15-amp d-c ammeter for measuring 4-pole field current.

The upper left-hand meter in the EMD box is a 0-50 amp d-c meter for measuring shunt field current. The one at the upper right is a 0-50 millivolt d-c meter and shunt for measuring battery field current. The meter at the lower left is a 0-100-volt instrument for measuring auxiliary generator voltage. At the lower right, is an a-c meter with a 0-250-volt scale for measuring alternator voltage.

Each meter is fitted with leads having the proper terminals. All terminals are marked, and as many as possible are polarized. All meters are fused. The set includes voltmeters.

The boxes have proved to be valuable time savers and have reduced meter casualties practically to zero. The boxes were designed and built by R. E. Wheeler, foreman, and Joseph Fabian, electrician.

...HY 20 ROADS ARE TESTING NATIONAL CARTRIDGE BEARINGS

Combines the ruggedness of the solid bearing with the advantages of a sealed unit — at a much lower cost!

That's the reaction we've been getting from the twenty railroads now testing the National Cartridge Bearing . . . a truly rugged, completely sealed and self-lubricated bearing—*at much lower cost than roller bearings.*

With its large 270° bearing surface, tough bronze parts, simple construction, and flat back design, the National Cartridge Bearing is far better able to stand up to impact than roller bearings.

The unit is so effectively sealed that it can go for months between oil checks. In the meantime no other inspection is needed. Cars equipped with the National Cartridge Bearing can be dumped without losing a drop of oil.

Installation is a cinch too. Only five simple parts and seven screws to the entire assembly. Slips on and off in a hurry, without need of special tools or facilities. Fits inside of the standard journal box after the dust guard well has been removed . . . or under pedestal side frames, either narrow or wide jaw, with the use of simple adapters.

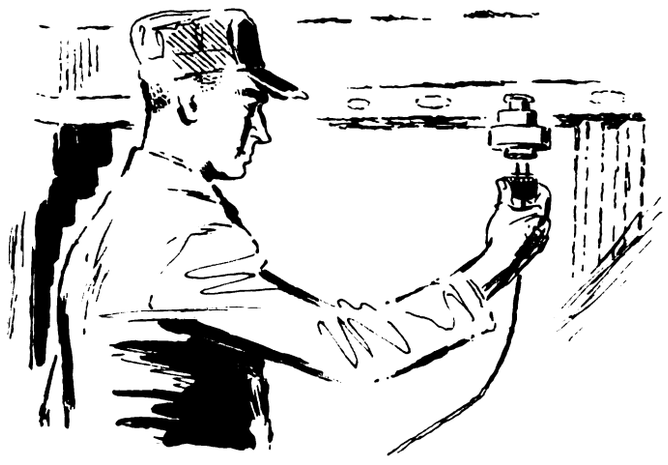
It's easy to see why twenty roads are testing the National Cartridge Bearing—it looks like the journal bearing of the future!

A-712

AMERICAN Brake Shoe COMPANY

RAILROAD PRODUCTS DIVISION
530 Fifth Avenue, New York 36, N. Y.

Extension Cord Ties Diesel to Its Load



By Gordon Taylor

WHEN ENGINEER Casey and Fireman Brown arrived at their home terminal with a three-unit EMD freight locomotive, an hour late, they reported a case of diesel trouble. Their story was about as follows.

The rear trailing "B" unit had failed about half way over the division. The locomotive had first given notice of trouble when it started slowing down, showing a lack of power. The fireman checked the trailing units and found that the rear unit engine was running but that none of the power contractors were cutting in. In other words, there was no way of getting power to the traction motors.

Now the fireman knew that it was necessary for the reverser to be thrown in either forward or reverse direction to pass power to the traction motors. He inspected the reverser and found it was in the forward position which was correct for the operation of this unit. He also knew that the *FO* trunk wire leading to the *FO* magnet valve should be energized to pass control current both *C-D* interlock on top of the reverser to the isolation switch, and so to the control circuit to bring in the power contactors.

Since the *FO* wire was apparently dead on this unit, the fireman naturally thought that the jumper control cable might be bad order. He then changed jumper cables but that did not cure the trouble.

By this time, the train had reached a point where a wayside telephone was available. The train was stopped and the crew notified the dispatcher to have an electrician meet the train at an intermediate servicing station about 15 miles away.

This was done, and electrician Bill Sparks was waiting when the train arrived. Bill heard the fireman's story and checked it out, finding the facts to be as stated by the fireman. Bill was faced with finding where the *FO* wire was open-circuited in the trunk cable. That could take a great deal of time and there was no time to waste. Something had to be done quickly or it would be necessary to set out part of the train. They could not afford to continue the trip at such slow speed.

Bill first thought that if the unit could be turned around, that it might operate okay, if the *RE* wire was all right in the trunk cable. It was a good thought, but there was no wye or turntable to turn the unit, so that idea had to be dropped.

Bill then said, "If there were some way we could get a temp connection from the positive side o battery, to the *C-D* interlock on reverser, we could then energize power contactors." Then he had idea that proved he was a real tr shooter.

Why not rig up a light exten cord with just one wire, attached one pole of an attachment plug. T plug it into the engine room ligh circuit and attach the other end to *C-D* interlock at the top of the rever This was quickly done. When th tachment plug was plugged into the ceptacle, nothing happened. Bill "I guess we are connected with negative side of the circuit." He qu pulled the plug and turned it aro to the opposite slot in the recepta When he plugged it in the second t that did it. Current from the po side of the battery could now through the *C-D* interlock and ener the power contactors.

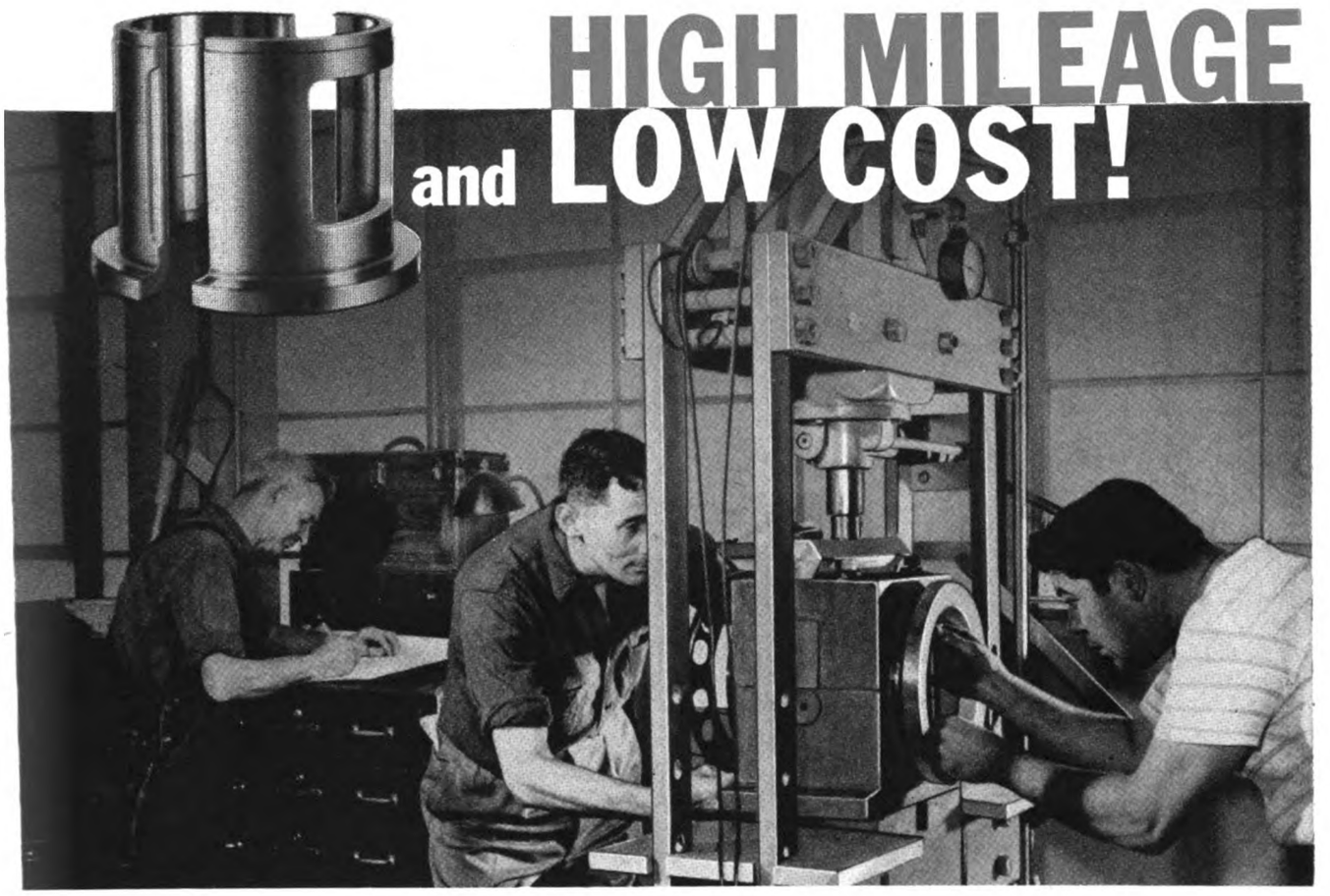
Now when the engineer opened throttle to Run 1 and, with the tra tion lever in No. 1 position, he co put the rear trailing unit to work T piece of light cord had tied the en to its load and the locomotive co proceed with full tonnage.

At the home terminal, at the end the run, the electricians had plenty time to locate the open circuit in *FO* wire. It was found to be br at the point where it was attached the terminal board located near ceiling in the end of the carbody

This was an unusual case, but shows what can be done by a tr shooter who is familiar with schem wiring diagrams and really underst the diesel control system.

A thorough knowledge and und standing of control circuits is a part of the ammunition carried successful trouble shooter on locomotives. It pays to start out a good supply of ammunition.— do not attach jumper wires to or a contactors in the control system you thoroughly understand the cir Otherwise you may do more harm good.

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.



Here's why Diesels, Electrics and MU Cars can all get maximum, trouble-free mileage with Magnus Traction Motor Support Bearings

Major roads from coast to coast have found that they can be sure of maximum mileage between overhauls by replacing only with genuine Magnus HIGH-MILEAGE Bearings. This performance is possible because Magnus puts extra care and precision into every bearing. Here are just a few of many Magnus features that mean more trouble-free miles and lower over-all costs.

Satco Lining Metal This patented, heat-resisting bearing metal, centrifugally applied by bearing experts, gives greater resistance to wear and load, plus stronger bonds and increased hardness at elevated temperatures.

Interchangeable Double Keyway Pioneered by Magnus, this improvement permits complete interchangeability between commutator and pinion shaft ends. Simplifies motor maintenance and bearing stockpiling.

Perfectly Mated Bearing Halves Flaw-free, fine-grained castings are finish bored for maximum uniformity of wall and flange thickness. Mated bearing halves are micrometer tested *under load*, assuring parallel ID and OD and uniform loading of each half.

Straight Bore or Hour Glass Design Many railroads today still prefer the straight bore design and now Magnus is your only source for these bearings. Magnus gives you either type — to your specifications.

Magnus Bearings are now available for replacement on all types and makes of diesel electric and electric locomotives and MU cars. And because of Magnus' streamlined production methods, new bearings cost so little that it doesn't pay to reline or rebuild old ones.

For the complete story on Magnus HIGH-MILEAGE Traction Motor Support Bearings, write for Bulletin No. 6000. Magnus Metal Corporation, 111 Broadway, New York 6; or 80 E. Jackson Blvd., Chicago 4, Ill.

OTHER MAGNUS PRODUCTS FOR DIESEL LOCOMOTIVES

Wheel Flange Lubricators

Safety Valves

Fuel Tank Sight Gages

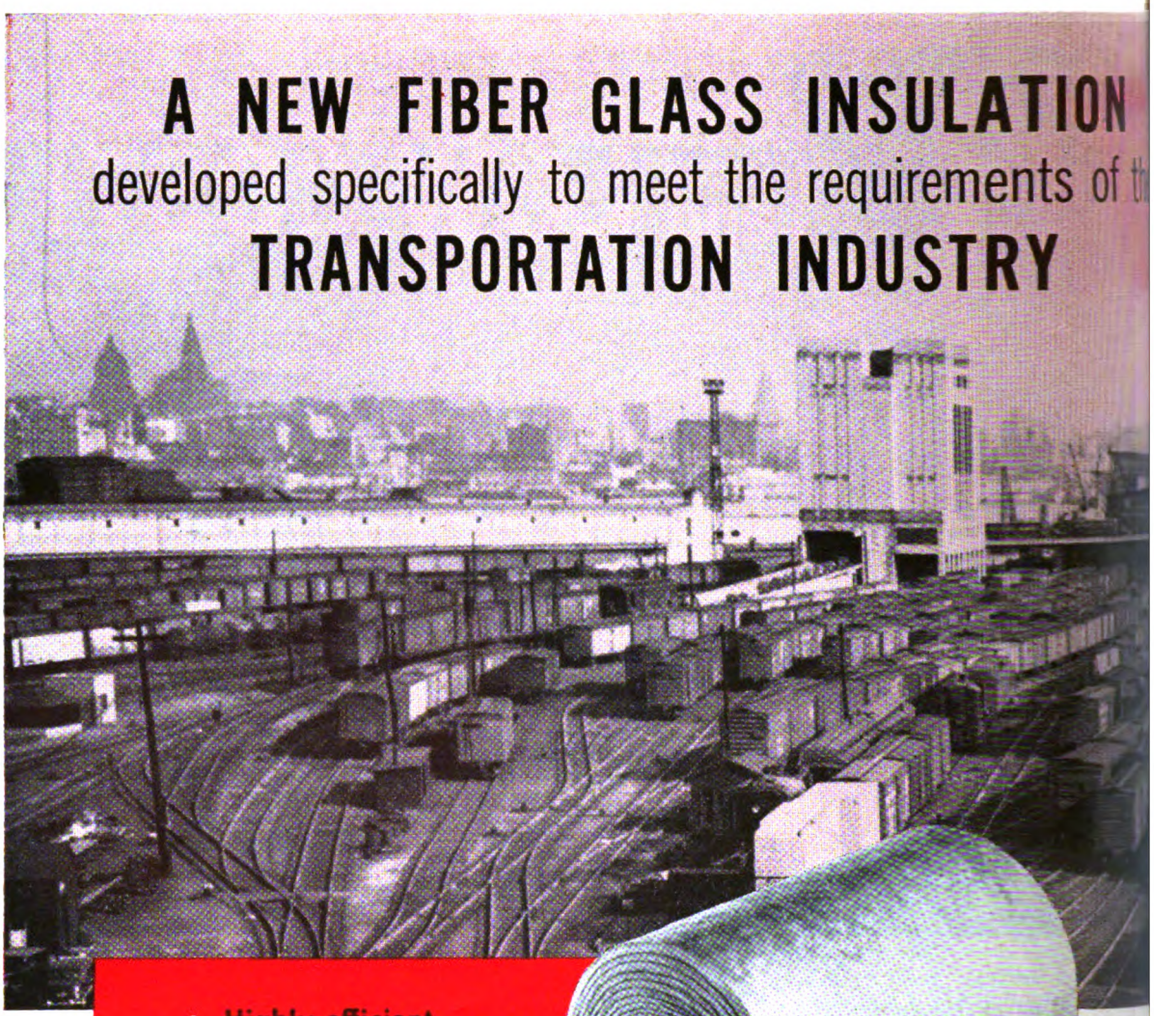
MAGNUS
High Mileage
TRACTION MOTOR SUPPORT BEARINGS

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**

A NEW FIBER GLASS INSULATION

developed specifically to meet the requirements of t

TRANSPORTATION INDUSTRY



- Highly efficient
- Moisture resistant
- Vibration resistant
- Durable
- Extremely lightweight
- Easily installed

WHAT IS TRANSULITE?

Transulite insulation is a lightweight, resilient blanket made of extremely fine glass fibers bonded together with a thermosetting resin.

It's *unique* because a specially developed binder minimizes moisture pick-up, even under severe operating conditions.

WHAT IS ITS BACKGROUND?

Transulite's background is the research laboratories of L·O·F Glass Fibers Company, where some of the most efficient thermal insulations known have been developed.

These insulations are widely used by th mobile, aircraft, original equipment, in construction and home building indust also used in appliances, air conditioning s trucks and trailers, metal buildings, homes and many other places.

L·O·F GLASS FIBERS

T ARE ITS ADVANTAGES?

Transulite is especially designed for the tation industry it offers:

rior thermal performance—one of nost efficient on a heat-resistance-to-ıt ratio.

erior resistance to moisture—when d for 14 days in a humidity cabinet :h as used in the railroad industry for ;erated cars—total moisture pickup by ·ption and adsorption combined was v the maximum permitted by the fications.

erior resistance to vibration—the most blesome over-the-track operating condi- present no hazard. Transulite holds its ion . . . resists sagging or settling when erly installed.

erior durability—protects your long ı investment because the inorganic glass s will not burn, rot or sustain rodents vermin.

Transulite's extreme light weight adds very little to overall unit weight . . . permits increased payloads . . . makes it easier to install! Rolls are pleasant to handle and are compressed to require less storage space.

WHERE IS IT USED?

Transulite performs best where the requirements are the most exacting. Its superior thermal performance and resistance to moisture make it the ideal insulation for refrigerated cars.

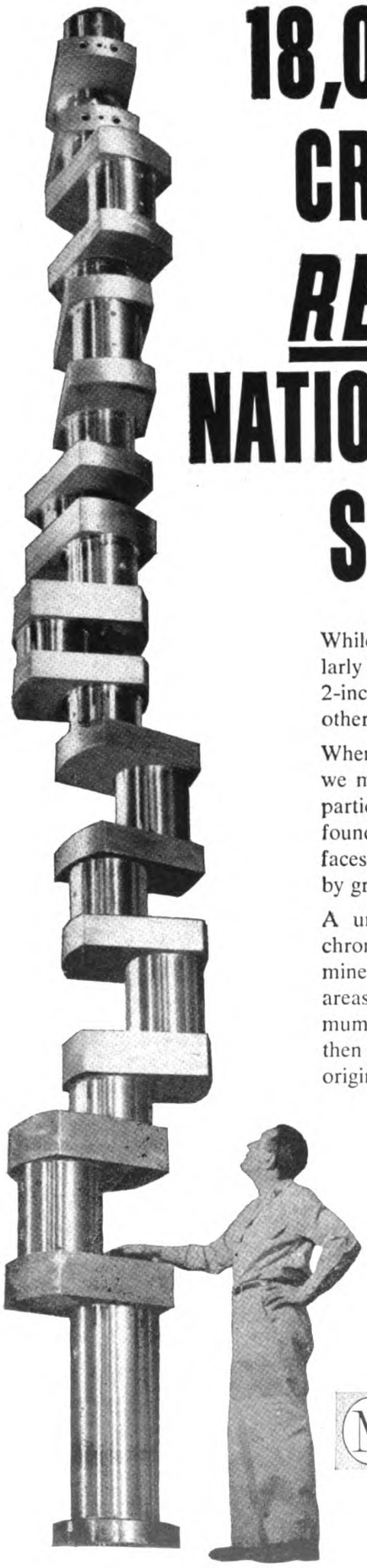
Transulite, as well as Super·Fine, Microlite and Microtex, other products of L·O·F Glass Fibers Company, answer insulation problems for passenger cars, box cars, tank cars and cabooses.

Available in thicknesses and densities to meet specific requirements. Widths up to 120″.

For more information about Transulite and how it helps to solve insulation problems, write to: *L·O·F Glass Fibers Company, Dept. 56-78, 1810 Madison Avenue, Toledo 1, Ohio.*

L·O·F GLASS FIBERS COMPANY

TOLEDO 1, OHIO



18,000 POUND CRANKSHAFT *REBUILT* BY NATIONAL FORGE SPECIALISTS

While National Forge specializes particularly in locomotive crankshafts, this 23-foot 2-inch compressor crankshaft was just another routine reconditioning job.

When this shaft arrived at National Forge, we made a thorough visual and magnetic particle inspection. After the shaft was found to be salvageable, all the bearing surfaces were prepared for chromium plating by grinding and grit blasting.

A unique plating machine deposits the chrome uniformly smooth to a pre-determined thickness—and away from fillet areas. After re-grinding—held to a minimum by accurate plating—the shaft was then finished ground and polished to the original specifications.

No other plating company has National Forge's experience in handling both new and rebuilt crankshafts. So, why not try National Forge Specialists on your next crankshaft rebuilding job?

Write for Bulletin RC-1.

NATIONAL FORGE & ORDNANCE COMPANY
IRVINE, WARREN COUNTY, PA.

Supply Trade Notes

(*Continued from page 10*)

UNITED STATES STEEL CORPORATION.—*Alfred Hoagland* appointed supervisor, service metallurgy, railroad materials and forgings.

AMERICAN STEEL & WIRE DIVISION.—*Edward A. Murray*, sales manager, Chicago district, appointed assistant vice-president of sales at Cleveland, replacing *M. D. Millard*, now administrative vice-president at Pittsburgh.

■

STANDARD RAILWAY EQUIPMENT MANUFACTURING COMPANY (CANADA) Ltd.—*R. G. Hudson* appointed vice-president and general manager.

■

OLIN MATHIESON CHEMICAL CORPORATION.—*Charles B. Brown* has been appointed manager, transportation industry sales, Aluminum division.

■

M & J DIESEL LOCOMOTIVE FILTER CORPORATION.—Chicago office of M & J moved to the Inland Steel Building, 30 West Monroe street, Chicago 3.

■

ARONSON MACHINE COMPANY.—*William L. Fisher* appointed eastern district sales manager; headquarters, Philadelphia area.

■

EVANS PRODUCTS COMPANY.—*James J. Chavis* appointed regional manager of the new South Central Regional office in St. Louis, Mo.

■

STANDARD RAILWAY EQUIPMENT MANUFACTURING COMPANY.—Executive and Chicago sales offices moved from 310 S. Michigan avenue to the Borg Warner building, Michigan avenue and Adams street.

■

GRIFFIN WHEEL COMPANY.—*R. H. Wellington*, general sales manager, appointed assistant to president.

■

DIESEL INJECTION SALES & SERVICE, INC.—Diesel Injection Sales appointed exclusive distributor in the United States for *Leslie Hartridge, Ltd.*, of England, manufacturer of fuel injection test and service equipment.

■

DUFF-NORTON COMPANY.—*Donald J. Wallace* named district sales manager; headquarters, New York. Formerly eastern district sales manager for the Coffing Hoist Division.

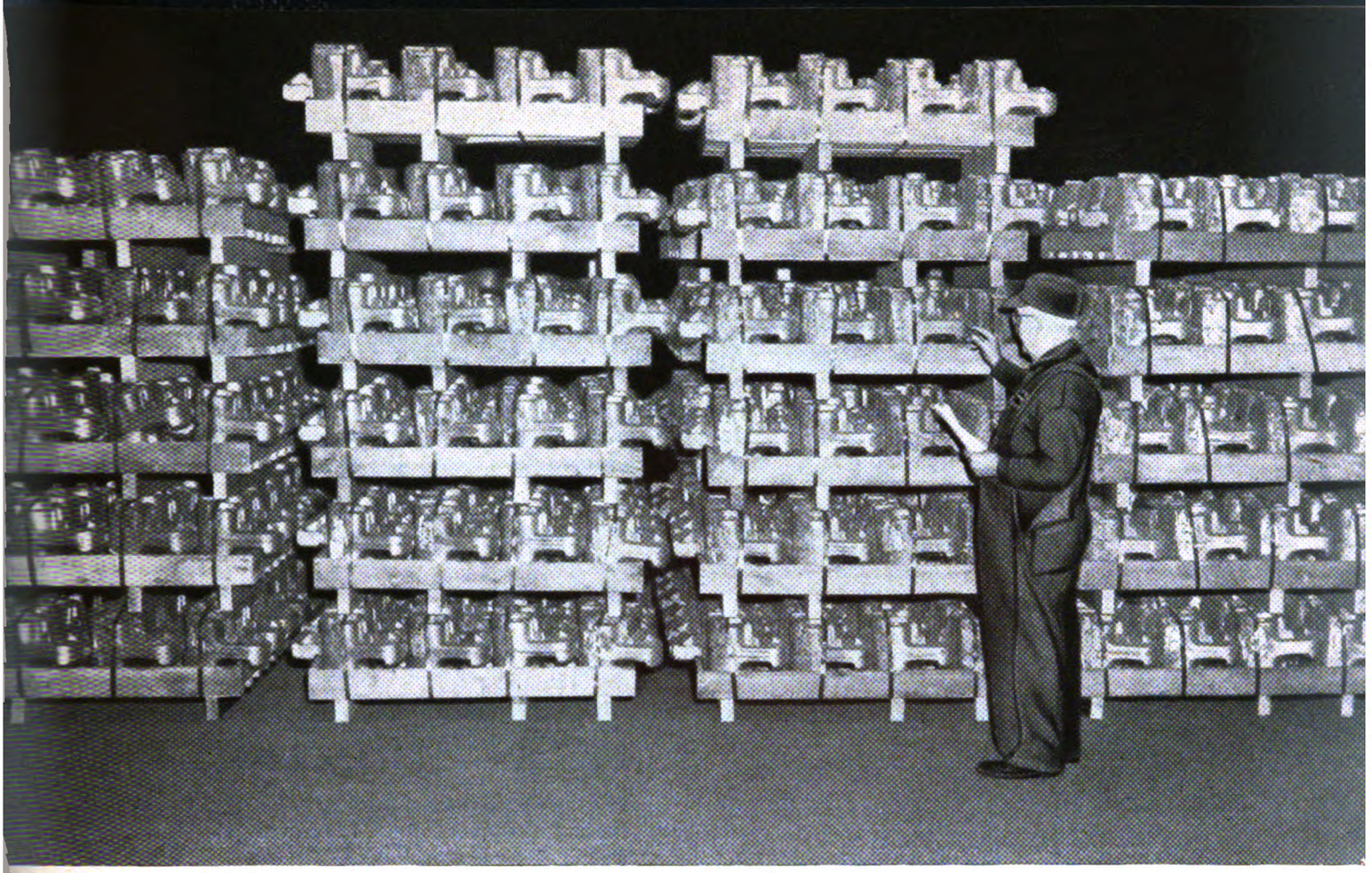
■

CRUCIBLE STEEL COMPANY OF AMERICA.—*John J. Bollinger* appointed western manager of Spring Division sales, at Cleveland, succeeding *William M. Stevenson*, retired after 50 years of service.

All metals research, development and metallurgical activity combined in a new Technology Department at Pittsburgh. *Dr. M. J. Day*, vice-president, Research and Development, now vice-president-technology.

Obituary

I. S. ACWORTH, assistant vice-president, General American Transportation Corporation, died on June 3 at the Illinois Masonic Hospital, Chicago, after a long illness.



Now...ASF Palletizes Coupler Knuckles at No Extra Cost!

There's just no comparison between the new, trim, 24-knuckle pallet and the old, time-wasting heap of knuckles. Everything about palletizing makes handling easier.

Unloading is easy and quick, with crane, magnet or lift truck. Knuckles are firmly banded to pallets, which can be stacked safely and neatly to any practical height—saving floor space. At inventory, simply count the *pallets*—24 knuckles at a time.

Palletizing at no extra cost is another way of demonstrating how ASF is constantly looking for ways to cut *your* stores costs. Specify these easy-to-handle knuckles—in multiples of 24!

ASF

American Steel Foundries

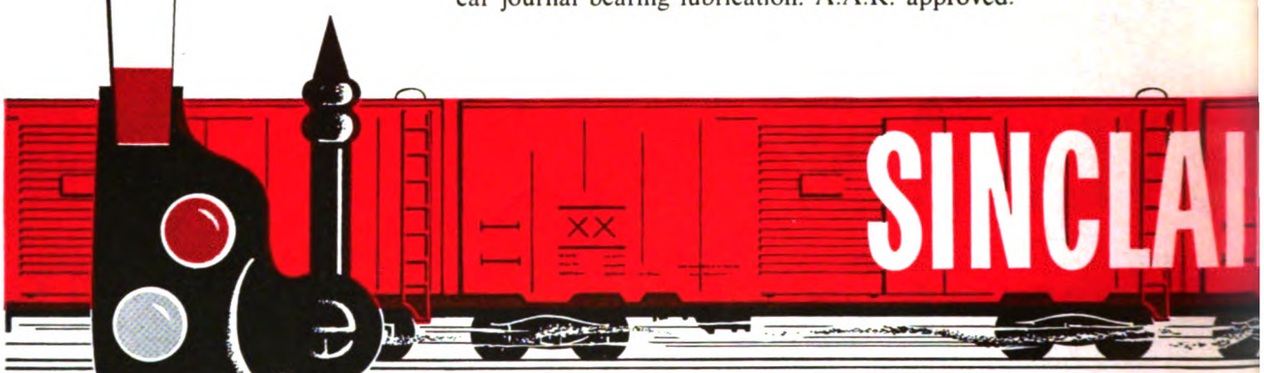
Prudential Plaza, Chicago 1, Illinois

Canadian Sales: International Equipment Co., Ltd., Montreal 1, Quebec

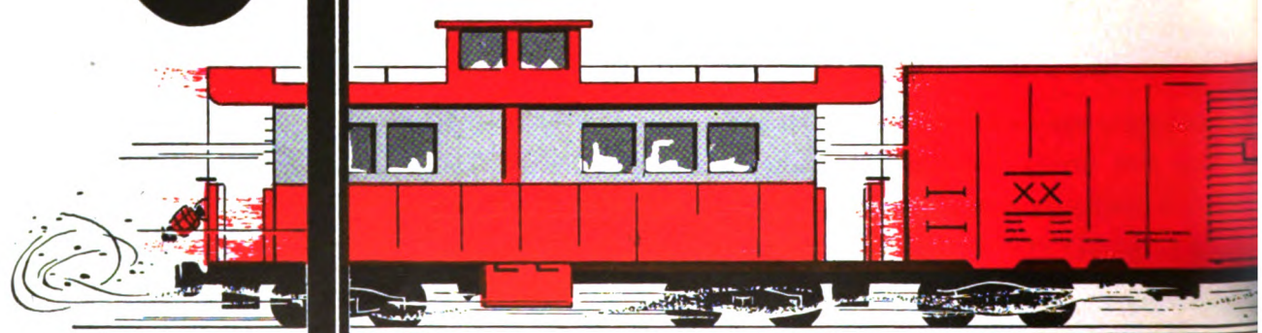
Other Foreign Sales: American Steel Foundries, International, S. A., Chicago

Today, more than 100 U. S. railroads prefer
Sinclair GASCON® OILS. Only a tried, tested and outstanding oil could make and *keep* a record such as this.

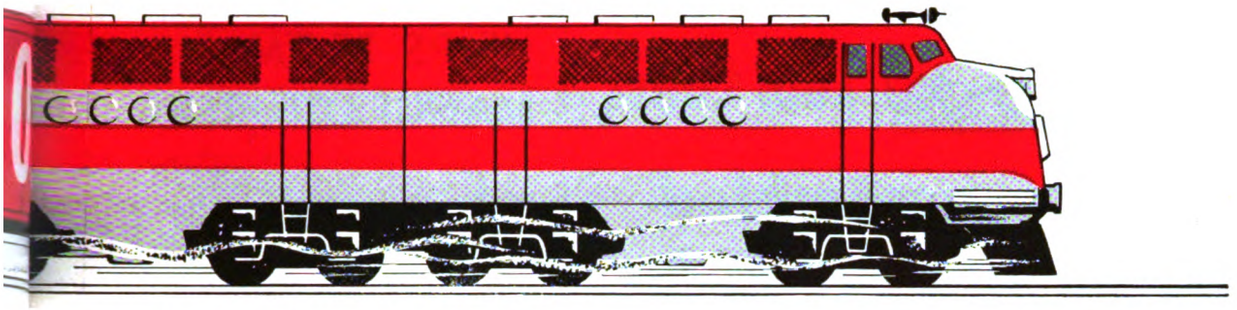
Proved superior for Diesel locomotive and car journal bearing lubrication. A.A.R. approved.

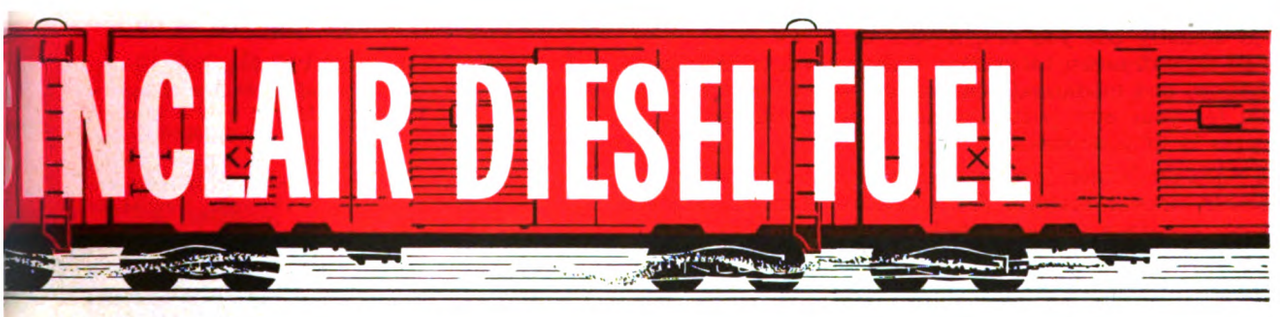


Unsurpassed for heavy-duty work in Diesel traction motor gears.



Only Sinclair Diesel Fuel contains the amazing rust inhibitor RD-119®. Used regularly, it effectively *stops* damaging rust and corrosion in fuel systems.

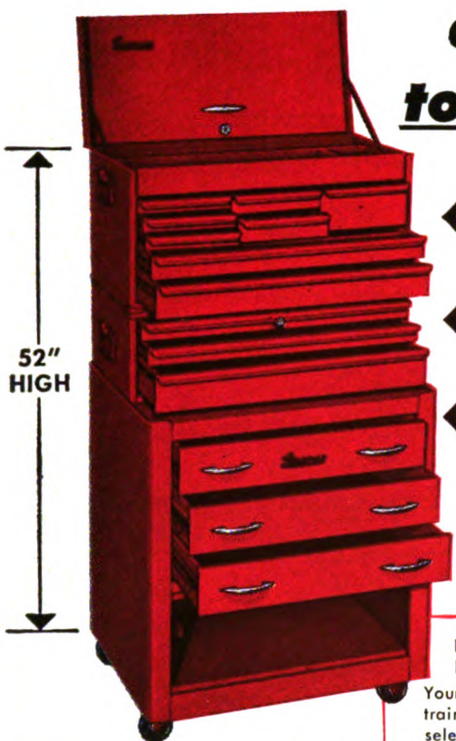




INCLAIR RAILROAD LUBRICANTS
.for Superior Diesel Performance

CLAIR REFINING COMPANY • RAILWAY SALES • NEW YORK • CHICAGO • ST. LOUIS • HOUSTON

Now! a Snap-on Tool Chest assembled to your order



KR-58A Tool Chest
26" x 12" x 14" high

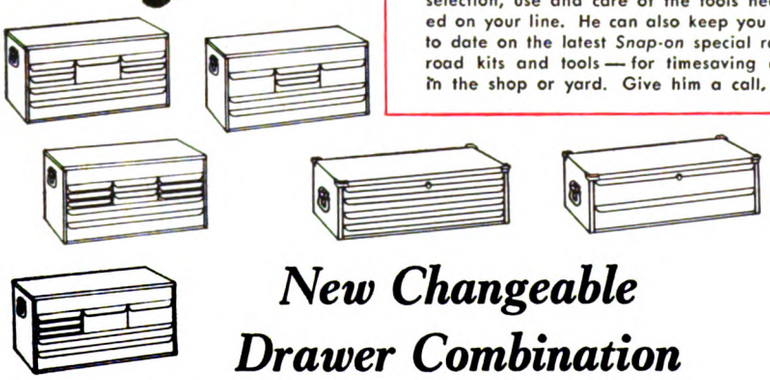
KR-421 Drawer Section
26" x 12" x 8" high

KR-352 Roll Cab
26¼" x 18" x 30" high

Snap-on KR-360
Triple-Unit Tool Cabinet

RAILROAD SPECIALISTS — IN TOOLS, IN SERVICE

Your Snap-on railroad representative is trained and experienced to aid in the selection, use and care of the tools needed on your line. He can also keep you up to date on the latest Snap-on special railroad kits and tools — for timesaving use in the shop or yard. Give him a call.



New Changeable Drawer Combination

This new *Snap-on* tool chest (top section) with changeable drawer combination actually *lets you design your own tool chest.* You can select all deep drawers, all shallow drawers or a combination of deep, shallow, and medium-depth drawers — get just the right combination for your own particular tools. And you can make future changes to fit your needs.

The new *Snap-on* drawer (center section) is also available with the changeable drawer feature. Two shallow drawers can be substituted for the deep drawer or a deep drawer substituted for the two shallow drawers.

The *Snap-on* roll cab (bottom section) gives you a tool chest on wheels. And you get all the built-in quality of *Snap-on* chests — heavy-gauge steel, closely spaced electric spot welds, extra-strong internal bracing and supports. All drawers are non-sag, non-spill, easy-running units with full-width, roll-type pulls for easy opening from any angle.

SNAP-ON TOOLS CORPORATION
Railroad Division
8130-G 28th Avenue • Kenosha, Wisconsin

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

"CUT YOUR FLAME-CUTTING COSTS." 12-page Form 1057 describes six ways in which Oxweld nozzles cut gas consumption and nozzle replacement. (Write: *Linde Company, Division of Union Carbide Corporation,* Dept. RLC, 30 East 42nd st., New York 17.)

CLEANING OF AIR CONDITIONING EQUIPMENT. Service Report B-7370 discusses procedures for the cleaning of air-conditioning equipment in coaches and refrigerator cars. (Write: *Oakite Products, Inc.,* Dept. RLC, 19 Rector st., New York 6.)

WHITING DROP TABLES. 16-page case study shows various steps required with drop tables for fast, economical and safe servicing of diesel and steam locomotives. Features section on pit designs, with detailed drawings of typical installations. (Write: *Whiting Corporation,* Dept. RLC, 15600 Lathrop ave., Harvey, Ill.)

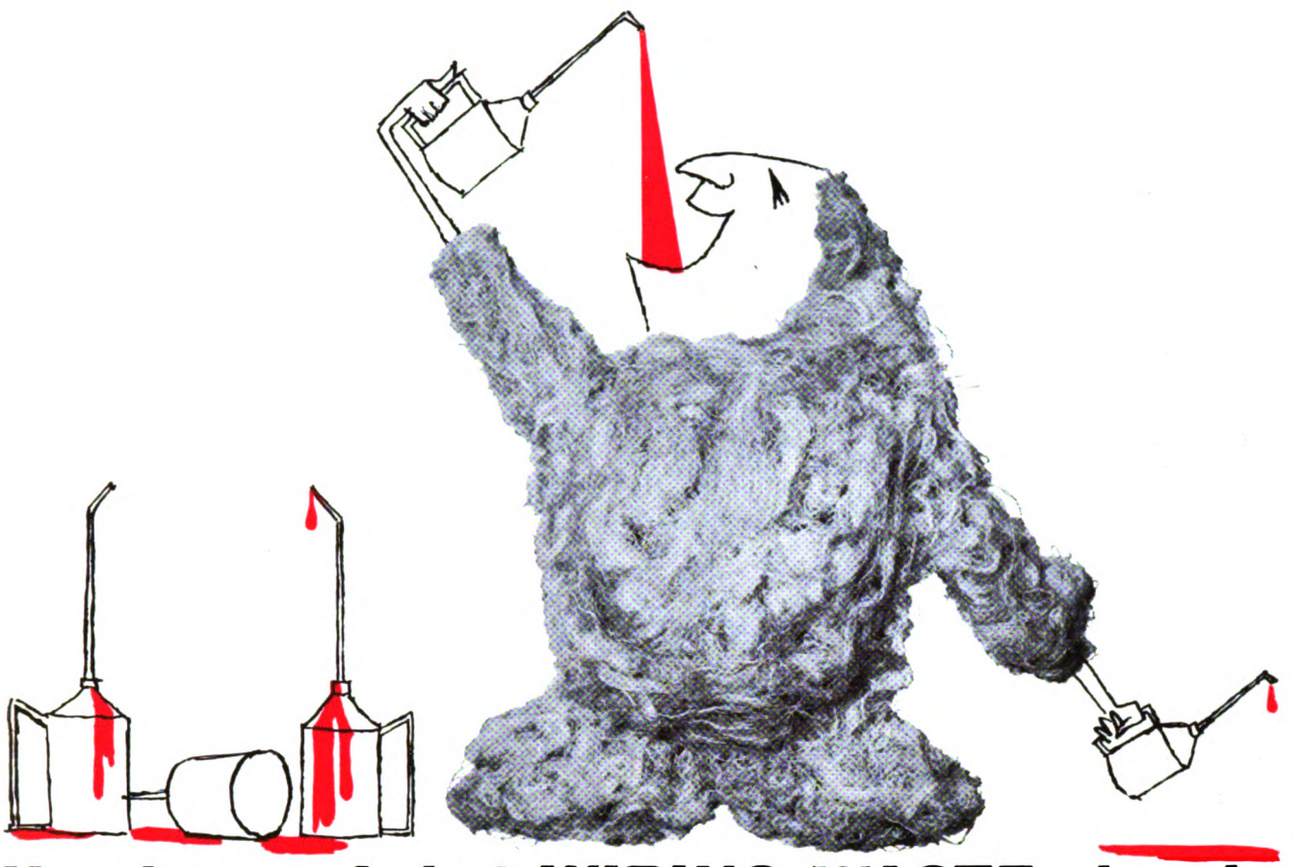
DUCTILE IRON PISTON. 4-page bulletin describes Hunt-Spiller ductile iron piston for the 600 series Baldwin engine. (Write: *Hunt-Spiller Manufacturing Corporation,* Dept. RLC, 383 Dorchester ave., Boston 27.)

SLING CHAINS. 28-page catalog DH-105 describes complete line of ACCO Registered sling chain—1-, 2-, 3- and 4-leg styles, plus necessary hooks and attachments. Recommended working load limits indicated (Write: *American Chain Division, American Chain & Cable Co.,* Dept. RLC, York, Pa.)

"MECHANIZED SQUIRT WELDER." 6-page folder describes the Lincoln ML-3 mechanized squirt welder, a semi-automatic, submerger arc type, guided by hand. Specifications given, also table of comparative welding speeds. (Write: *Lincoln Electric Company,* Dept. RLC, Cleveland 17.)

HOT BOX DETECTIVE. 6-page folder describes how the Servosafet Hot Box Detective is installed at track side and how it inspects and indicates on a chart the relative temperature level of each journal on a train moving past. (Write: *Servo Corporation of America,* Dept. RLC, 2020 Jericho Turnpie, New Hyde Park, L. I., N. Y.)

MOLYKOTE. Bulletin No. 115 (3¼ in. by 4½ in.) covers in detail, preparation of metal surfaces for the proper application of Molykote resin bonded lubricant coatings. Includes instructions for degreasing all metals; phosphating of stainless steels; sandblasting of chrome plate, nickel plate and stainless steel; anodizing of aluminum and aluminum alloys, etc. Application of the coating, either by spraying or dipping, and required baking times covered n detail. (Write: *Alpha-Molykote Corporation,* Dept. RLC, 65 Harvard ave., Stamford, Conn.)



Here's proof that WIPING WASTE absorbs over four times as much oil as cloths!

. . . certified test report available on request

In precise, scientific tests conducted by a prominent Chicago engineering firm, cotton wiping waste and wiping cloths were compared to determine their absorptive qualities. Samples were tested under identical, controlled conditions. The carefully tabulated figures prove once and for all that wiping waste absorbs 443% as much oil as the same amount of wiping cloth! The complete report of these tests has been prepared and is available free upon request. Use the convenient coupon below.

Actually these new tests only bear out old facts already known to most users of wiping waste. Wiping waste, consisting of all new, uniform threads, is by its very nature more consistently efficient. What's more, since good quality wiping waste can be purchased at a much lower initial cost per pound than proper quality wiping cloths, waste is considerably cheaper to use.

All in all, it adds up to one thing: You'll get more efficient performance, at lower cost, by switching to cotton wiping waste.

INSTITUTE OF THREAD MACHINERS — Quality WIPING WASTE — MEMBER

INSTITUTE OF THREAD MACHINERS, INC.

84 Field Point Road
Greenwich, Connecticut

Institute of Thread Machiners, Inc.
84 Field Point Road
Greenwich, Connecticut
Dept. RL-2

Gentlemen:

Please send me a copy of your engineering test report on cotton wiping waste.

Name_____

Organization_____

Address_____

City_____ Zone____ State_____

Electric Impact Wrench
UL and CSA approved

TWO NEW KITS
Air-powered
Model MM-43
illustrated at right

Electric-powered
Model MM-40
not illustrated

Save on locomotive maintenance with new Remington Impact Wrench Kit

OTHER DEPENDABLE REMINGTON POWER TOOLS

Air Small-Wheel Grinder, Model PG-2022L—Wheel diameter: 1" vitrified, 1½" organic; speed: 22,000 rpm at 90 psi.; equipped with regulator; length 10⅛"; wt.: 1¾ lbs.

Air Drill, Model PD-328P—½" capacity; air-powered; speed: 575 rpm at 90 psi.; built-in oiler and speed regulator, ball bearings throughout; with geared chuck and key.

Electric Flexible Shaft Machine, Model BFGP—3-hp induction motor, totally enclosed, dustproof; geared drive delivers 4,500 rpm for grinding, sanding, wire brushing.

Air Circular Saw, Model P128—12" blade cuts full 4⅝"; cuts 3⅜" at 45°; blade guard; safety trigger switch. Complete with blade, case and hose.

Here's a new concept for improved worker efficiency—a multi-purpose power tool that can save costly man-hours in maintenance. The new Remington Mechanics Maintenance Kit features a reversible impact wrench—air or electric models available—plus special accessories that handle drilling, screwdriving and wire brushing as well as bolting. Each kit is portable and *complete*—air kit includes filter-lubricator and 15-ft. hose. On-the-job tests prove kits do maintenance work significantly faster.

Choose the power most efficient for you. Remington power tools are made in **AIR, ELECTRIC OR GASOLINE-DRIVEN MODELS**

FREE CATALOGS

Send for free illustrated booklet on Mechanics Maintenance Tool Kit giving examples of savings. Also available: a catalog on complete line of Remington Contractor and Industrial Tools. Mail the coupon—there is no obligation.

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*Company*_____

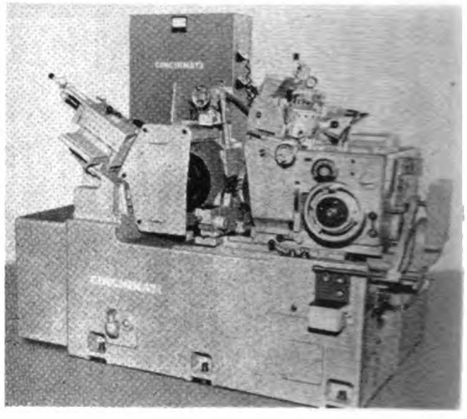
*Address*_____

*City*_____ *Zone*____ *State*_____

(*Continued from page 12*)

journal. The wicks are made from a blend of nylon, wool and cotton yarn, selected to provide optimum oil delivery, wick-rise rate, abrasion resistance, aging properties, and chemical stability.

Road tests have shown that Cool-Pak allows a journal to run as much as 17 per cent cooler than loose packing. The manufacturer reports this is true because Cool-Pak exerts relatively light pressure on the journal and the looped wicking arrangement provides a free air space which aids in dissipating journal heat. Cool-Pak has been approved by the AAR for test application. *Uni-Pak Corporation, Dept. RLC, Box 8302, Swissvale, Pittsburgh 18.*



Centerless Grinding Machines

Cincinnati centerless grinders Nos. 2 and 3, rated at 15 hp and 25 hp, have been improved. Grinding wheel truing controls are now located at the left-hand end of the bed for added convenience, and the bed is 5 in. longer, to provide support for these grinding wheel truing units.

New grinding fluid control, consisting of new deflectors within the wheel guard and a new three-way adjustable nozzle, eliminates splashing and more effectively floods the work. A greater selection of accessory equipment is now available. One is the vari-pitch unit for hand infeed grinding equipment. A precision indicator attachment for rapid, visual taper correction is also available. *Cincinnati Grinders Incorporated, Dept. RLC, Cincinnati 9.*

Insulating Tape

A Class B pressure-sensitive electrical tape, Scotch No. 55, combines the mechanical strength of a non-woven polyester web and the electrical properties of a polyester film. It consists of a non-woven polyester film laminated to a polyester film and coated with a true thermosetting, pressure-sensitive adhesive.

The tape is used in splicing lead wire con-

(*Continued on page 56*)

These switchers were death on brushes

...'til the road tried NATIONAL TRADE-MARK

M. HENIKA

The road switching locomotives of this railroad were breaking hundreds of brushes per month, says "National" Carbon Brush Man Morgan Henika.

Source of the trouble was severe vibration caused by widely varying operating conditions. Morgan recommended "National" brushes grade DE-3 for their special shock-resistant qualities.

RESULT: in the next twelve months, not one report of brush breakage.

Trouble-shooting is a specialty of "National" Carbon Brush Men serving the nation's railroads. The men's training, backed by National Carbon's *long term brush development*, make them your best consultants.

Call your "National" Carbon Brush Man or write to National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

UNION CARBIDE

"National", "N" and Shield Device, and "Union Carbide" are registered trade-marks of Union Carbide Corporation

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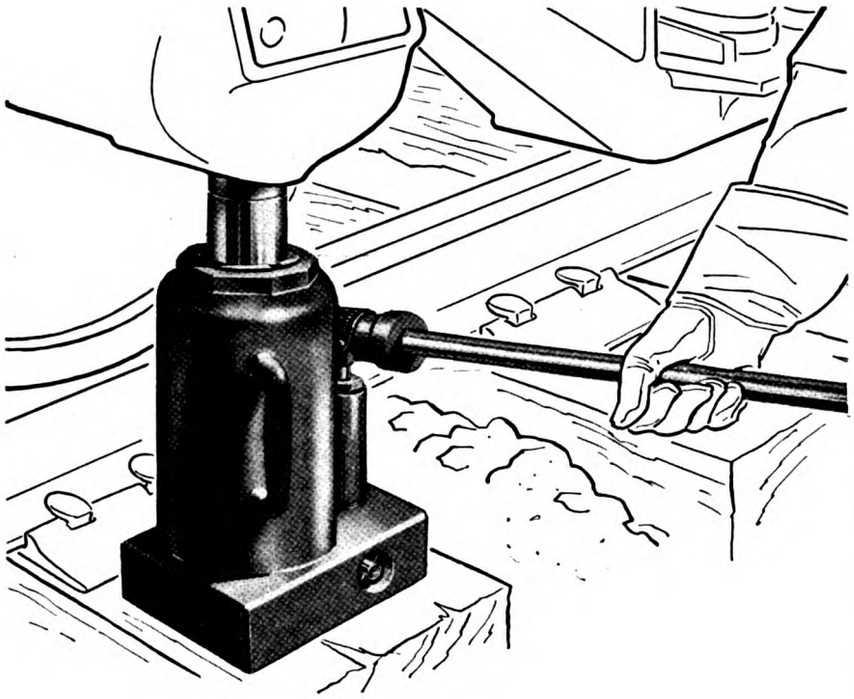
Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. *In Canada:* Union Carbide Canada Limited, Toronto.



NEW! A 35 Ton Hydraulic Journal Jack

First in the Industry!

You asked for it and here it is—a brand new jack designed and built especially for servicing heavier freight cars. It can raise 35 tons 6 inches—is only 9.7 high—weighs but 55 pounds. With the 35H9.7, the job of inspecting and renewing journal brasses can now be done without the danger of overloading a lower capacity hydraulic journal jack—and the work can be done faster with less effort! If you have the problem of lifting heavy cars, we suggest you get complete details on this new 35 ton hydraulic journal jack immediately. Write the world's oldest and largest manufacturer of lifting jacks for bulletin AD-16-G.

DUFF-NORTON COMPANY

P. O. Box 1889 • Pittsburgh 30, Pennsylvania

COFFING HOIST DIVISION • Danville, Illinois

DUFF-NORTON JACKS
Ratchet, Screw,
Hydraulic, Worm Gear

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COFFING HOISTS
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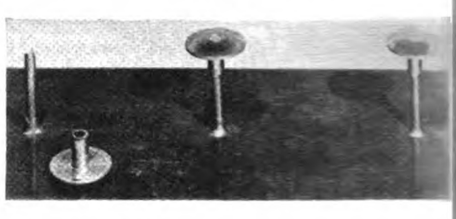
Spur Gear, Electric

nections, for lead saddles and pads, strapping, coal covers, interlayer insulation, slot edging and other Class B applications. It is particularly suited for uses requiring maximum tear strength and excellent physical strength, and is non-corrosive. *Minnesota Mining & Manufacturing Co., Dept. RLC, St. Paul 6, Minn.*



Threadless Aluminum Stud Cap

Designed specifically for installing insulation, this threadless aluminum-alloy stud cap has a positive interference lock on the special threadless steel studs. The studs have either ⅛-in. or 3/16-in. nominal diameter, and a variety of shank lengths are provided to permit application over a broad range of material thicknesses.

The studs with which the Huck caps are used are not threaded, but have annular grooves. The cap is installed by tapping it onto the stud with a hammer. *Huck Manufacturing Company, Dept. RLC, 2480 Bellevue avenue, Detroit 7.*

Rust Solvent

This fast acting penetrant and rust solvent, "Spray Nuts-Off," is designed to loosen everything rusted or corroded. The product is a combination of oils, penetrants and rust solvents. It cleans small parts such as spark plugs, battery terminals and carburetors. Spray Nuts-Off has no offensive odor and is packaged in a 12-oz Aerosol container and in pint and gallon containers. *Spray Products Corporation, Dept. RLC, P.O. Box 584, Camden 1, N. J.*

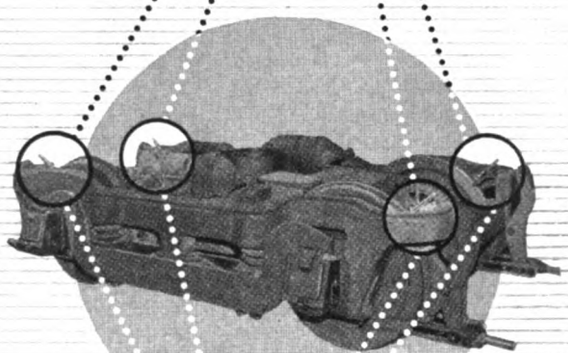
Battery Packaging

Exide-Ironclad MGD diesel locomotive cranking batteries are now packed in corrugated boxes, instead of wood crating. Batteries shipped in 1,600-lb palletized foursomes can

EXTEND

LOCOMOTIVE WHEEL LIFE

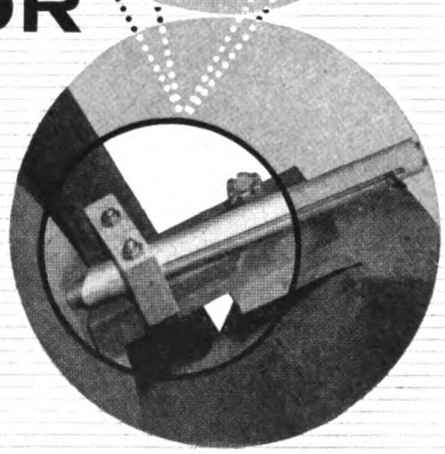
30% TO 300%!



Nalco TYPE TA

FLANGE LUBRICATOR

USING Nalco "MOLY" STICKS



Nalco "Moly" Stick is a highly-efficient *dry* lubricant that maintains a lubricating surface between locomotive wheel flanges and track under extremes of pressure and temperature . . . without *picking up dirt and sand to form a grinding compound.* In new Nalco Type TA Lubricators, "Moly" Sticks provide automatic flange lubrication that has extended wheel life from a substantial 30% to as much—particularly on yard locomotives—as a whopping 300%!

Cost of Nalco Type TA Lubricators and "Moly" Sticks is small. Maintenance is limited to occasional stick replacements. Complete installation of lubricators on a diesel unit can be done by your shop personnel in four hours or less.

Call or write for details on the simplicity and continuing economy of Nalco Flange Lubrication for your locomotives.

NATIONAL ALUMINATE CORPORATION
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CANADA: Alchem Limited, Burlington, Ontario
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Nalco® PRODUCTS . . . SERVING RAILROADS THROUGH PRACTICAL APPLIED SCIENCE

One of the big reasons why commutator reconditioning costs have been coming down!

STACKPOLE
diesel electric
BRUSHES

for maximum mileage consistent with smooth, burn-free commutation

STACKPOLE CARBON COMPANY, St. Marys, Pa.

be safely tiered to two or three-pallet height, and freight savings as high as 60 per cent are reported.

The design permits slipping off carbon tops to give batteries a booster charge right in boxes, without unpacking. Drop flaps in the container ends permit easy access to battery lifting-holds. *Exide Industrial Division, Electric Storage Battery Company, Dept. RLC, 12 S. 12th st., Philadelphia 7.*

Remote Controlled Truck Crane

This remote-controlled truck crane enables a single operator to direct the crane at the point of use as well as operate the crane. The remote control system is operated by heavy duty double solenoids. This feature enables the operator to steady the load at the same time that he is operating the controls and is especially useful for long and bulky material. The crane lifts 5,000 lb and fits in an 18-in. mounting space. The boom swings 280 deg. The high pivot point of the boom over the truck bed provides maximum clearance for heavy loads and ample area for rotation of the boom over the cab.

The hydraulic pump that operates the crane is driven by power-takeoff on the truck's transmission. *Anthony Company, Dept. RLC, Streator, Ill.*

Ductile Iron Piston

This ductile iron piston for Baldwin-Lima-Hamilton 600 series engines is designed to replace the standard aluminum piston. High-strength ductile iron combines the wear and heat resistance properties of cast iron with the high strength-to-weight ratio of aluminum. The hardness of ductile iron is 220-250 Brinell, compared to 120 Brinell for aluminum. This provides extra service life in such critical areas as compression ring grooves.

A design change exposes all of the piston crown and compression ring area to oil cooling, which increases the operating life of the piston. A large eastern railroad equipped a locomotive with Hunt-Spiller ductile iron pistons over 3 years ago. Since that time, the locomotive has operated over 100,000 miles mostly in pusher service. When the locomotive was shopped recently, the pistons were found in excellent condition, with no wear on the ring groove lands. There were no stuck or broken rings. *Hunt-Spiller Mfg. Corporation, Dept. RLC, Boston.*

(Continued on page 60)

America's foremost engineered lettering tools

designed to reduce your present costs 50 to 80%

Used today by 1/3rd of the Nation's leading Railroads . .

DN

Spray it— STENCILS

PRESSURE SENSITIVE TYPES

Easy to apply. No skill required. Produces the most accurate and durable type of lettering, numerals, medallion, and other types of markings. Adds long life to your identification or advertising on all your equipment . . .

Whatever your lettering problems may be regarding identification, advertising, reflective or non-reflective, the DEMP-NOCK LETTERING SYSTEMS can help you get the job done in less time.

For additional information write Dept. RR-100

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DEMP NOCK

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HELP! THE POST OFFICE . .
HELP! THE POST OFFICE HELP YOU.

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"GOOD IDEA" COUPON (clip and mail)
RAILWAY LOCOMOTIVES & CARS
BOX 961 BRISTOL, CONN.
PLEASE ADD MY POSTAL ZONE

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CITY ..... ZONE STATE .....

FOR MEN ON THE MOVE... in a hurry

TOLEDO®

DROP HEAD RATCHET TOOLS

Furnished in three sizes, from ⅛" to 2" capacity, the TOLEDO Drop Head Pipe Threader offers light, handy threaders for all-round work. Ideal for close corners, tiresome overhead threading, wherever time means money. Thousands of these handy threading tools attest to their value and popularity. Dies are changed in seconds by simply pulling a pawl—the die drops out. Slip in another and you are ready to go. If you haven't tried the TOLEDO Ratchet Threader, see one at your supply house . . . next trip.

THE TOLEDO PIPE THREADING MACHINE CO.
Toledo 4, Ohio

Send for Bulletin No. 4

BUILT RIGHT—PRICED RIGHT

No. 22 VISE

For quality at a low, low price the TOLEDO 22 is best. Solid, dependable, timesaving . . . its Acme threads insure long wear. For a more positive grip, use the TOLEDO 25. Its five jaws eliminate any torque slippage. ⅛" to 4½" capacity. Both are typical TOLEDO quality tools.

BUILDERS OF THE WORLD'S FINEST PIPE TOOLS

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The Standard the World Over for ELECTRICAL INSULATION RESISTANCE TESTING

Whether you are involved with signals, communications, air conditioning, traction motors, or generators, there is a MEGGER electrical testing instrument to help you check out your work quickly, easily and with assurance. Write for RR FILE #2-X.

Ohmmeters and Megohmmeters for measuring resistances from 1 microhm up to 200,000 megohms.

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SPEED MEASURING INSTRUMENTS

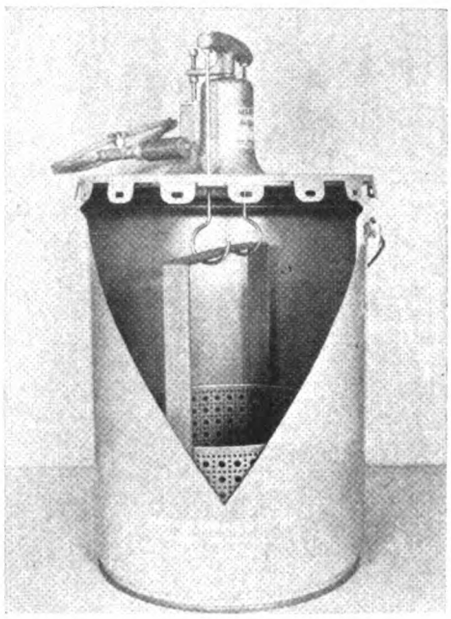
For rotational, surface, or lineal speed measurements, to check slippage, stresses, load, lubrication, friction, power transmission accurately and safely.

Write for BULLETIN 35-X.

JAMES G. BIDDLE CO.
Electrical & Scientific Instruments
1316 ARCH STREET, PHILADELPHIA 7, PA.

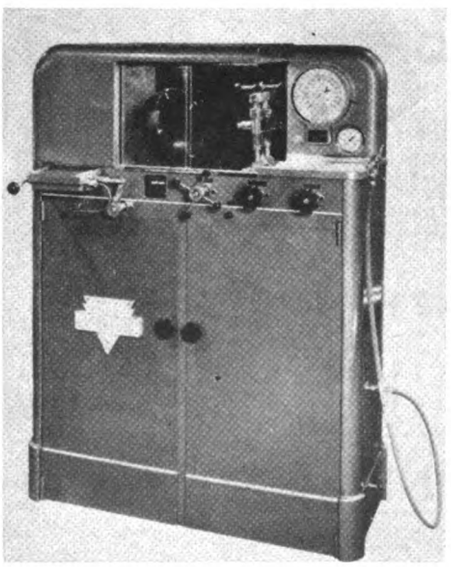
What's New

(*Continued from page 58*)



Air Powered Parts Cleaner

The Mini-Dip air-powered parts cleaner is a bench type machine, with built-in air motor. It is mounted on the container cover of any standard five, six or 15 gal open-head container and connects to the shop air supply. The basket of parts is agitated up and down 100 times a minute. The Mini-Dip handles up to 50 lb. of parts at a time. *Magnus Chemical Company, Dept. RLC, South ave., Garwood, N. Y.*



Injector Tester

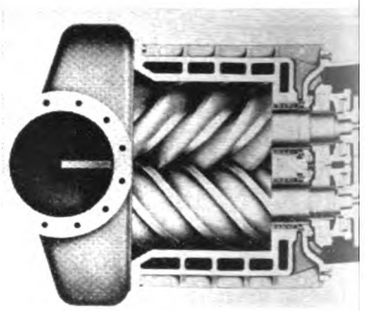
The Hartridge Universal diesel nozzle analyzer permits the testing of a nozzle during any part of the injection period. It allows observation of needle action throughout the period when it actually lifts and returns to the body seat, and checks the degree of atomization at any part of the injection.

With this analyzer, the injector is [illegible] by the application of a continuous flow high pressure oil to the nozzle. The [illegible] can be varied from no flow to full delivery and maintained at any flow rate.

Other features include a quick-action injector holder, illuminated spray cabinet, combination time and pressure gage, and centrally located controls. *Diesel Injection & Service, Inc., Dept. RLC, 808 Un[illegible] Norfolk, Va.*

Freight-Car Enamel

This "direct-to-metal" enamel may be applied either by hot or cold spray, requires no primer and, according to the manufacturer, will lower finishing costs and provide greater versatility in finishing methods. The rust-inhibitive pigments in it provide a built-in protective coating. Finishes dry to a 3- to 4-mil film built with normal two-pass spraying. Freight cars may be pounce or spray-stenciled in three to four hours. The enamel is available in black, red and standard railroad colors. *Transportation Division, Sherwin-Williams Company, Dept. RLC, Cleveland 1.*



Rotary Compressors

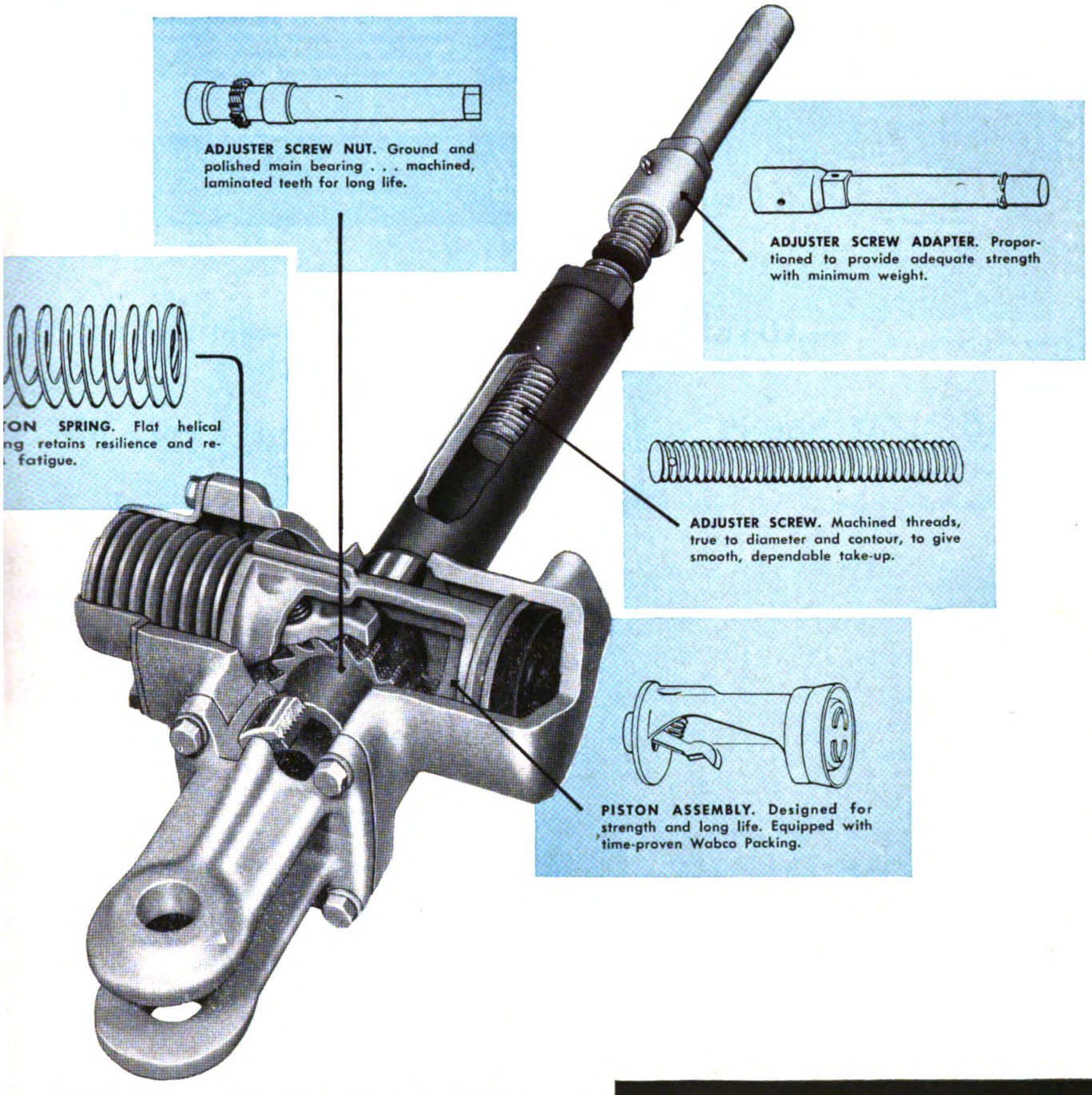
These positive-displacement rotary compressors, designed for continuous heavy-duty industrial service, have a standard capacity range of 800 to 13,000 cfm. Compact design saves floor space and reduces foundation costs.

The compressor is a two-impeller, helical lobe, axial-flow, rotary machine with a four-lobe power impeller and a secondary impeller with six matching gaps synchronized by timing gears. The impellers rotate with a true rolling motion, and power is transmitted to the secondary impeller through the compressed gas. Without metal-to-metal contact between impellers or casing, it is necessary to lubricate the impellers. The standard compressor casing is a casting [illegible] with water passages for jacket cooling. Two single-stage compressors include a range of compression ratios up to 50 to 1 which would permit intake at atmospheric pressure and discharge of 60 psi. The two-stage compressors, with ratios up to 11 to 1 [illegible] develop a maximum pressure of 150 psi.

Because of its high operating speed, the rotary compressor can be driven by induction or synchronous motor, diesel engine or steam turbine. *Fairbanks, Morse & Co., Dept. RLC, Chicago 5.*

lere are the Reasons the Type "D"

DOES THE JOB—STAYS ON THE JOB



ADJUSTER SCREW NUT. Ground and polished main bearing . . . machined, laminated teeth for long life.

ADJUSTER SCREW ADAPTER. Proportioned to provide adequate strength with minimum weight.

TON SPRING. Flat helical ng retains resilience and re- fatigue.

ADJUSTER SCREW. Machined threads, true to diameter and contour, to give smooth, dependable take-up.

PISTON ASSEMBLY. Designed for strength and long life. Equipped with time-proven Wabco Packing.

ch of the simple, rugged operating parts in the West- ghouse Type "D" Slack Adjuster is designed to stand under long, punishing service. The Type "D" has e same fine engineering you find in Westinghouse r Brakes . . . the same basic design principle that has en proved in many years of passenger service.

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COMPANY

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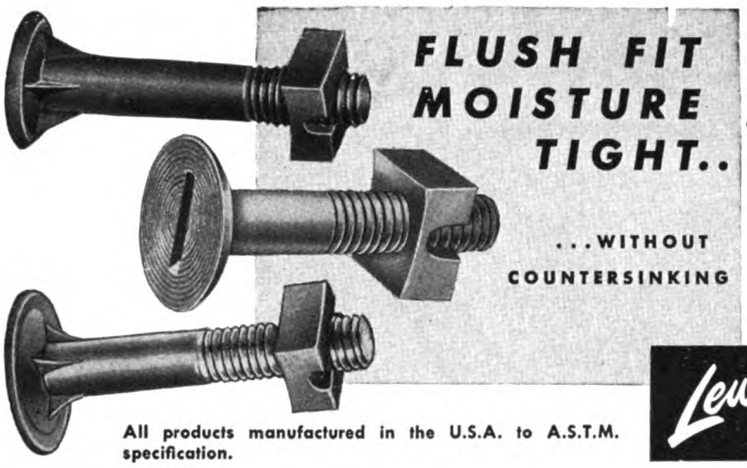
Westinghouse

Type D

Pneumatic-Automatic

SLACK ADJUSTER

for Freight Cars



Lewis sealtite car bolts

Each Lewis Sealtite car bolt has special "wood engineering" beveled head for flush, moisture tight, fit ... without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning ... slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

All products manufactured in the U.S.A. to A.S.T.M. specification.

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MINNEAPOLIS 14, MINNESOTA

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—ADVERTISERS IN THIS ISSUE—

Adams and Westlake Co. 4
American Brake Shoe Co., Railroad Products Div. 43
American Steel Foundries 49
Archer-Daniels Midland Co. ..... Inside Back Cover

Biddle Co., James G. 60
Broderick & Bascom Rope Co. 7

Dana Corporation 39
Demp-Nock Company 59
Duff-Norton Mfg. Co. 56

Electro-Motive Division, General Motors Corporation 34, 35
Esso Standard Oil Co. 13

Fairbanks-Morse & Co. 41

General Steel Castings Company 11

Institute of Thread Machiners, Inc. 53

Lewis Bolt & Nut Co. 62
L•O•F Glass Fibers Co. 46, 47

Magnus Metal Corporation 14, 45
Mall Tool Co., Div. of Remington Arms, E. I. Dupont De Nemours & Co. 54

National Aluminate Corporation 57
National Carbon Company, Div. of Union Carbide Corp. 55
National Electric Coil Company 3
National Forge and Ordnance Co. 48
National Malleable & Steel Casting Co. 21-24

Pullman-Standard Car Mfg. Co. 6

Sinclair Refining Company 50, 51
Snap-On-Tools Corporation 52
Sperry Rail Service, Division of Sperry Products, Inc. 37
Stackpole Carbon Co. 58

Texas Company ..... Inside Front Cover
Timken Roller Bearing Co. ..... Back Cover
Toledo Pipe Threading Machine Co. 59

Uni-Pak Corporation 8, 9
Union Carbide Corporation, National Carbon Company 55

Westinghouse Air Brake Company 61
Wine Railway Appliance Co. 19

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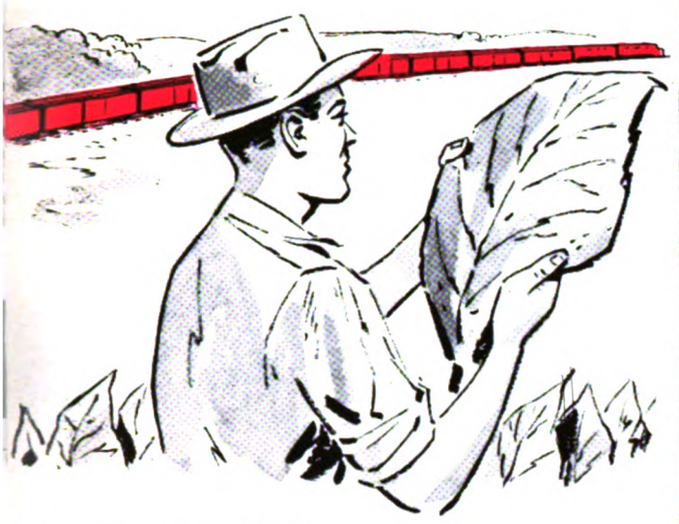
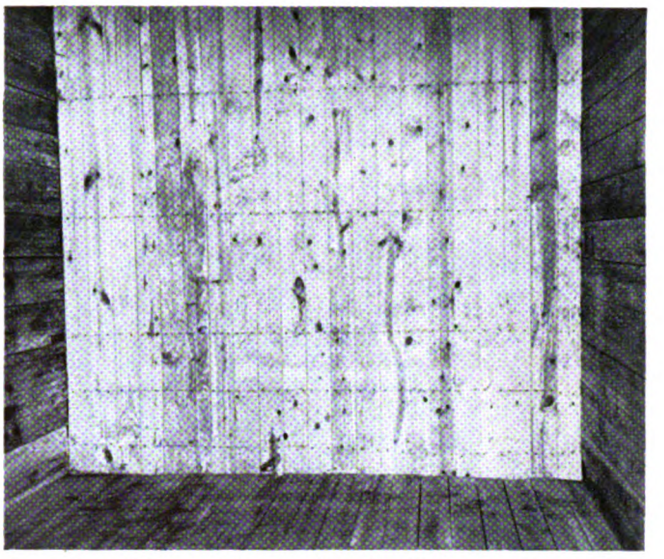


On the Norfolk and Western



Here is before-and-after evidence of the results you get with ADM Freight Liner 810 in boxcars.

1,968 Cars readied for Tobacco, Flour, Paper, Feed, Grain loading with **ADM Freight Liner 810**

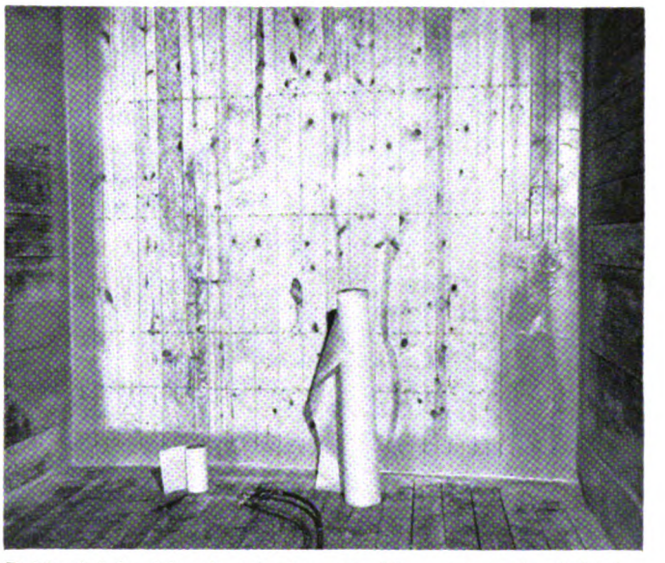
The Norfolk and Western Railway Company began coopering cars with Freight Liner 810 two years ago. The ADM system was found so satisfactory that the line has since Freight-Lined 1,968 cars for shipment of such commodities as paper, flour, tobacco, feed and grain. Today, the N & W uses ADM Freight Liner 810 at five points along its line.

Like so many roads, the Norfolk and Western finds Freight Liner ideal when sealed, smooth interiors are a must. The plastic-and-fiberglass treatment seals rough or broken walls and corners with a smooth, tough surface that is moisture-proof and easy to clean. Of special interest is its ability to seal grease and oil stains, allowing cars to be used for easily-contaminated ladings.

The Pure Food and Drug Administration approves ADM Freight Liner 810 for shipment and storage of foodstuffs.

Freight Liner is popular for other reasons, too. Railroads appreciate its economy, versatility, and ease of application. With a little practice, two men can repair 30 cars a day, patching, relining, and resurfacing. And in most cases, cars can be loaded within three hours after relining.

ADM technical service personnel will be happy to show you how Freight Liner can solve your high-grade loading problems. For a demonstration on your cars at any location, write, wire, or phone ADM Freight Liner System, Archer-Daniels-Midland Company, **700** Investors Building, Minneapolis 2, Minn. (FEderal 3-2112)



Finished job dries in minutes, provides a smooth, tight interior with top-notch sanitary protection.

Archer-Daniels-Midland

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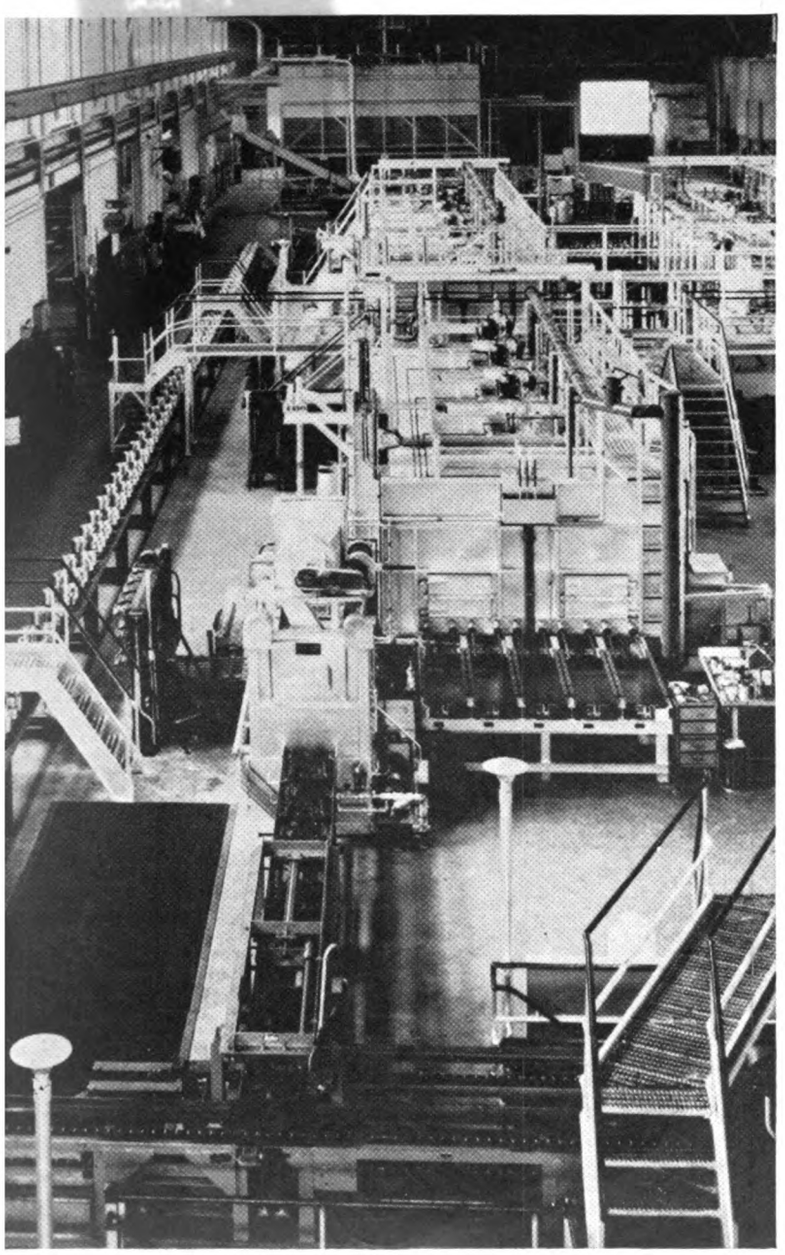
New Timken® "AP" bearing production line to help railroads save $224,000,000 a year

New revolutionary plant, devoted exclusively to making roller bearings for freight cars, can cut bearing costs!



HIGH SPEED production techniques and ultra-modern machines like this boost our output, can lower costs.

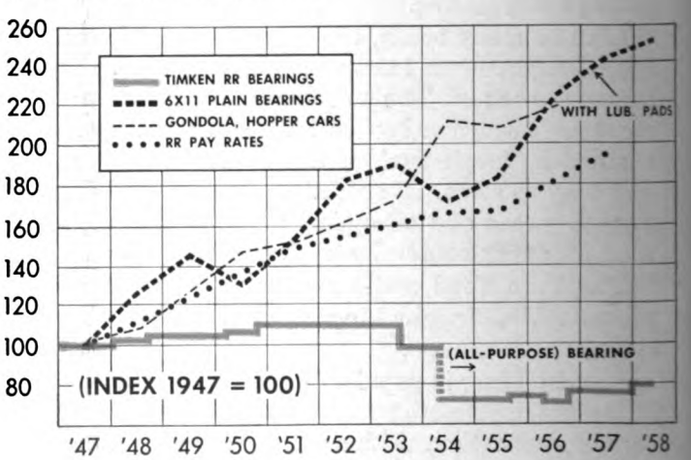
20,000 car-set annual capacity helps the railroads plan purchases of roller bearings, modernize on a regular basis

High uniformity of precision will give railroads still better bearing performance, still greater "Roller Freight" benefits

AN amazing new kind of production line at Columbus, Ohio is turning out Timken® tapered roller bearings *for freight cars only.* With a capacity for producing 20,000 car-sets a year by missile-age techniques, it's a $7 million example of the Timken Company's faith in the railroads' future.

Your railroad can make the most of this plant by joining with the other railroads and ordering a specified number of Timken bearings every year. The resulting *planned* production will keep your bearing costs at a minimum—help you plan economical shop schedules that will further reduce the cost of going "Roller Freight". And it will speed the day when all freight is "Roller Freight" — for estimated yearly savings of $224,000,000 or about $113 per car in operating and maintenance costs.

Take advantage of your new roller bearing production line by switching to "Roller Freight". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

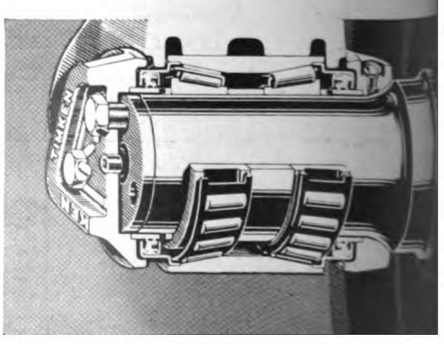


HOLDING DOWN COSTS will be the result of this new plant. Chart shows how Timken bearing costs are staying down—other railroad costs going up. Buy new Timken "AP" bearing assemblies from this plant and *keep* your bearing costs down.

TIMKEN TAPERED ROLLER BEARINGS

TRADE-MARK REG. U. S. PAT. OFF.

"Roller Freight" is the next great step in railroading



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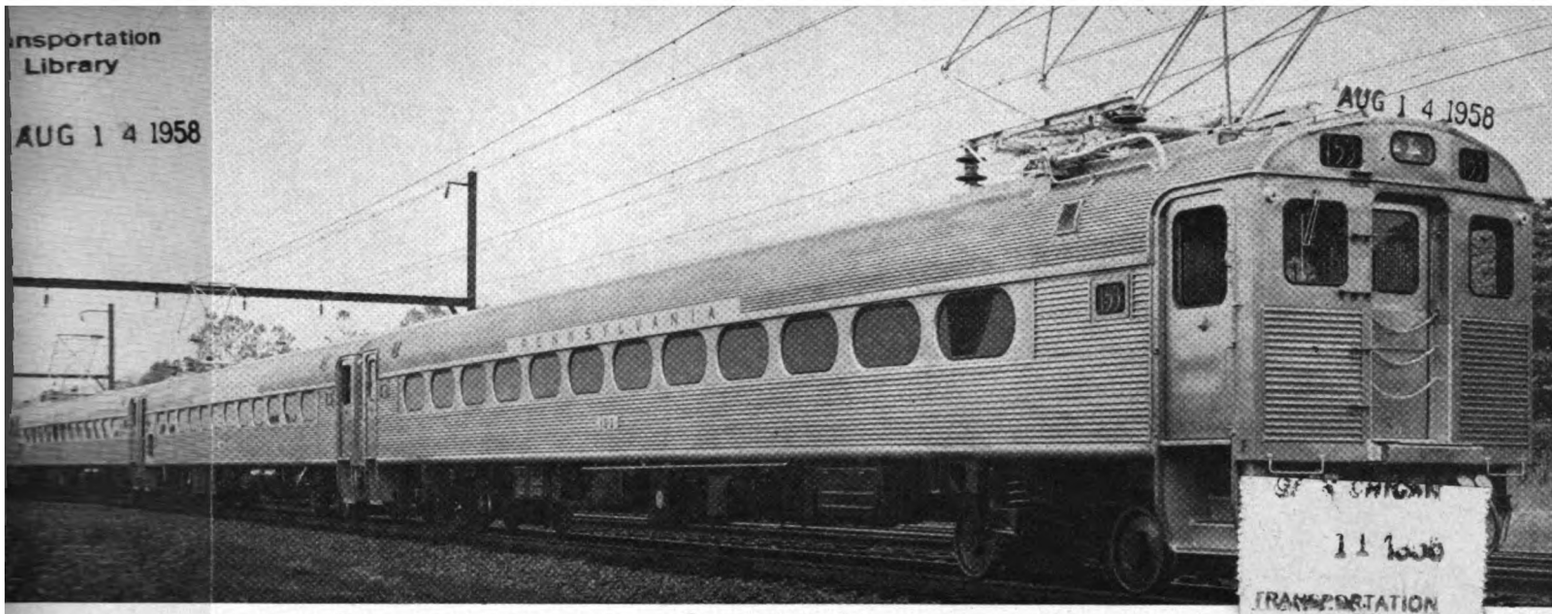

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TRANSPORTATION

Pennsy Ignitron-Rectifier M-U Cars . . . . . Page 21

AILWAY

LOCOMOTIVES AND CARS

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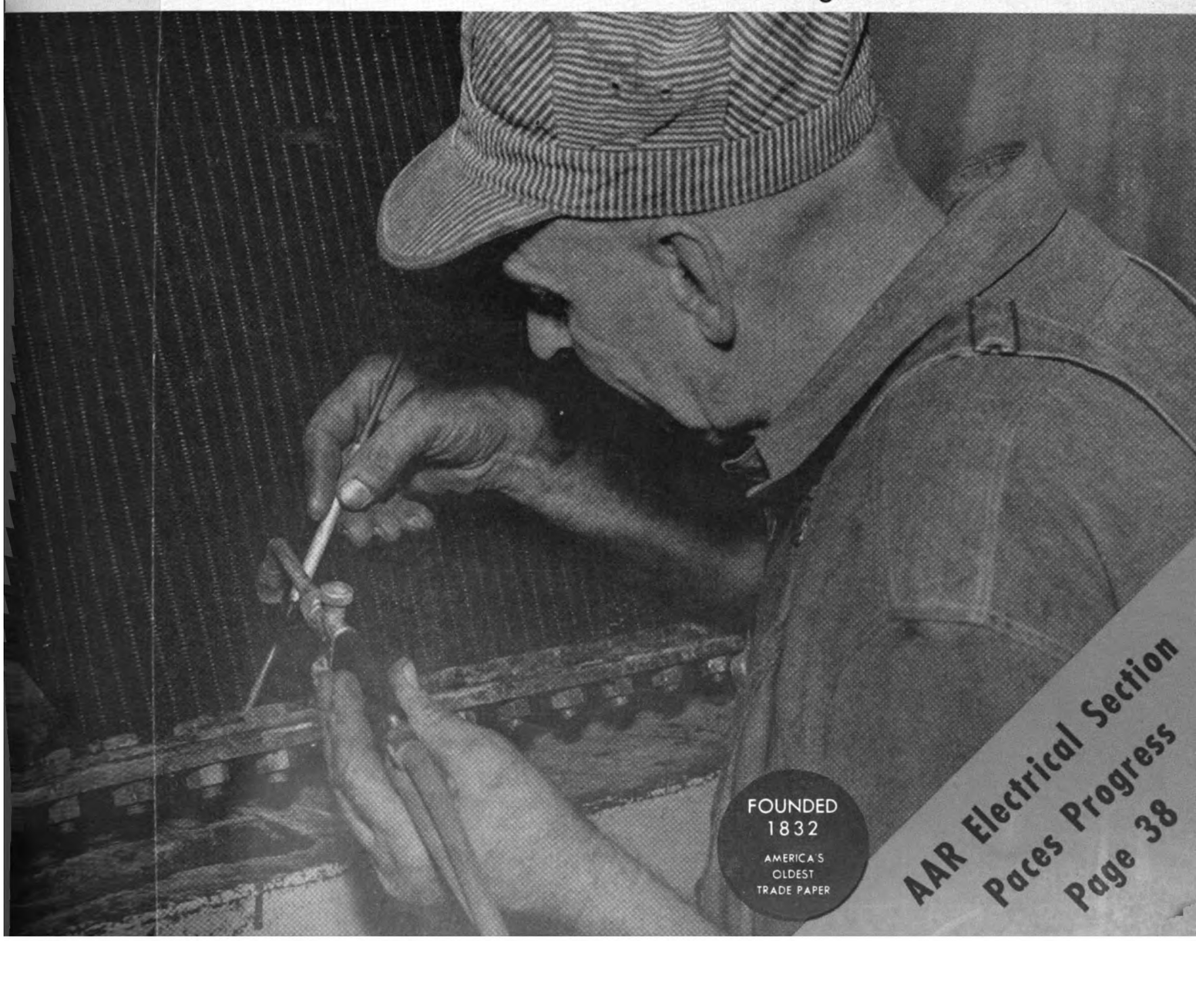
Frisco Overhauls Diesel Radiators . . . . . Page 24



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AAR Electrical Section
Paces Progress
Page 38

MINER DRAFT GEARS

contribute greatly to railway operation economies as they guard lading from damage and serve with maximum efficiency for an extremely long period of time.

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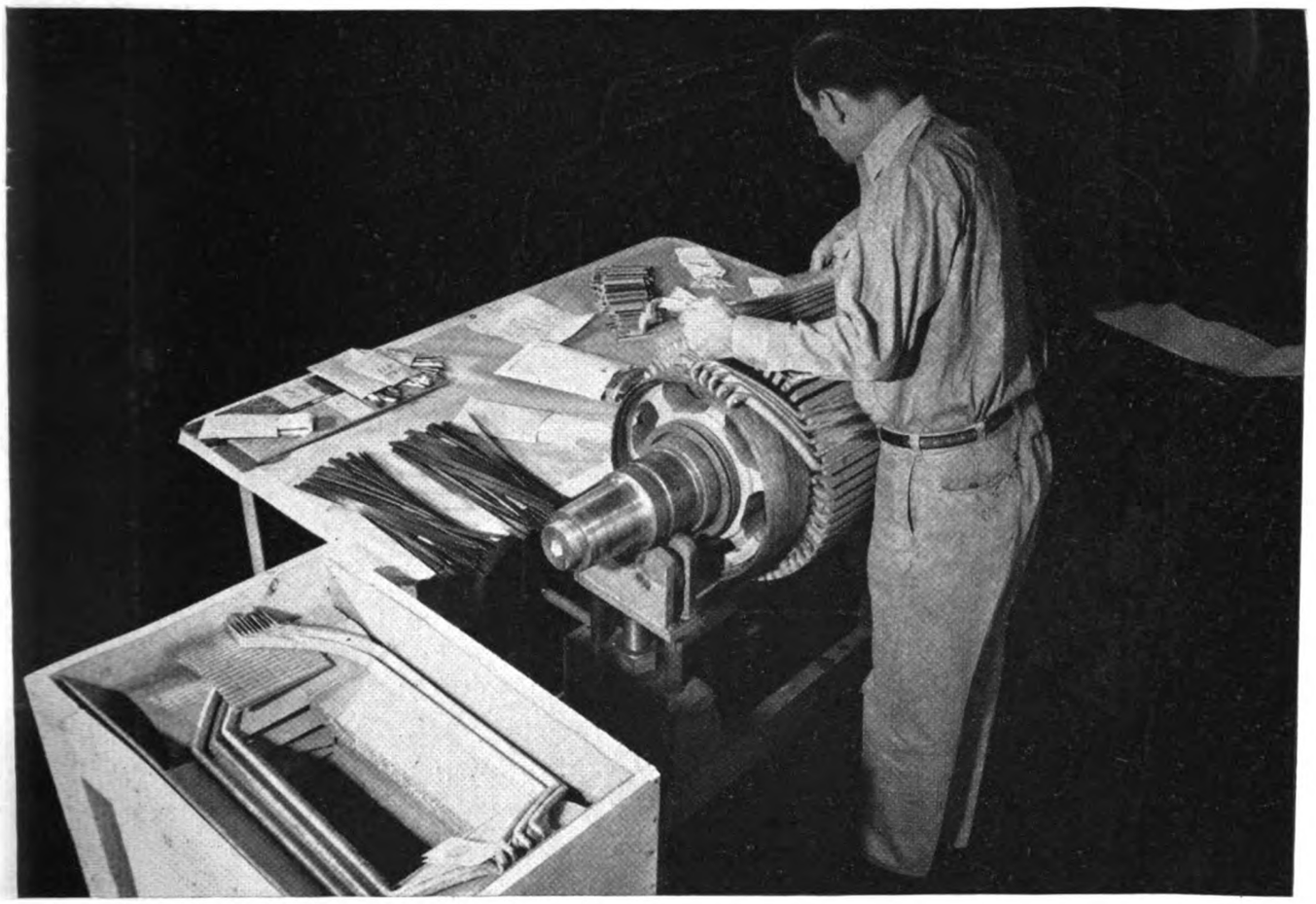

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Esso Diol RD crankcase oils meet the need of modern diesels for very effective and economical detergent lubricants that will provide maximum protection for sensitive engine parts.

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The good oxidation stability of the base stock in Diol RD oils is bolstered by the detergent-inhibitor additive used. Result: greater mileage between oil changes, with consequent lower costs. For data or technical assistance call your local Esso office or contact: Esso Standard Oil Co., Railroad Sales Division, 15 W. 51st St., New York 19, N. Y. *perfected by research... proved in performance*

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REPORT FOR AUGUST

Special Committee Works on Red Book Rules

The AAR advises that the permanent liason committee appointed to handle interpretation of Red Book rules with the ICC is now functioning. Agreement as to the intent of certain rules has been reached and some informal discussions have been had with the ICC.

Under the new law, the present AAR Rules for Inspection Testing and Maintenance of Air Brake Equipment on Locomotives and Cars, as revised in 1957, will become the Rules of the Interstate Commerce Commission. Since there may be other rules in need of clarification, the AAR considers it advisable to get such questions clarified if possible, prior to August 9, 1958, the effective date of the ICC order. Future questions pertaining to interpretation or clarification are to be reported to the Mechanical Division office for handling by the Special Committee.

Santa Fe Unveils "Shock Control" Freight Car

The Santa Fe has unveiled its first new "Shock Control" freight car, ATSF 10001—a modified DF box car with a floating underframe—an order for 100 of which was reported on page 5 of the July issue. The car is also equipped with roller-bearing ride-control trucks with long travel springs and 6x11 journals to compensate for additional weight and to provide 60-ton capacity instead of the 50-ton capacity usually specified for a car of this size.

The "Shock Control" design incorporates into the car a movable center sill with a predetermined amount of travel in either direction. A hydraulic device located horizontally in the middle of the car retards the sill travel. The gear absorbs impact energy from both buff and draft impacts without inherent recoil, according to the Santa Fe. Sill travel covers 10 in. in either direction.

Use of the "Shock Control" system with conventional high-capacity draft gear, the Santa Fe indicated, will protect fragile lading at impact speeds of up to approximately 12 mph.

The cars are scheduled for construction during August and September at the company's Topeka, Kan., shops.

AAR Roller Bearing Inspection Requirements

The AAR has recently issued information to all members on inspection of roller bearings on freight cars in interchange service. It covers bearings currently being supplied according to the "Specifications for Approved Journal Roller Bearings Applicable to Interchange Freight Cars" included in the Manual starting on Page D-39-1957.

Roller bearings of this type are easily identified because they have exterior end caps which rotate when the car is in motion. These roller bearings of all manufacturers are interchangeable in all types of side frame adaptors. The bearing outer race is the housing for the bearing assembly and the whole assembly is interchangeable in the various types of side frames using suitable frame adaptors to transmit the load from frame to bearing. Since many maintenance and inspection personnel are not familiar with these applications, the information is provided until similar materials is available in AAR publications.

Inspections should include the following:

1. *Check the operating temperature.*—Running temperatures of 15 to 50 deg above at-

(*Continued on page 8*)

TIME SAVING IDEAS FOR AUGUST

MOTIVE POWER AND CAR

Budd Pioneers Go Into Pennsy M-U Service 21
Here's How the Frisco Overhauls Radiators 24
How Great Northern Applies Cement Flooring 26
Ceramics Work in C&EI Diesels 27
Improving Diesel Fuel Filtration 28
Slide and Graduating Valve Connections (AB Color Schematics) 29
Northern Pacific's Approved Lube Pad Cleaner 32
Wheel Flat Has Traveling Jib Crane 36

ELECTRICAL

Pacing Electrical Progress (AAR Electrical Section) 38
The Perverse Reverser 46
Armature Inspection and Test (Roll Them Out Like New) 48

DEPARTMENTS

Programs Coordinated Mechanical Associations 8
Letters to the Editor 14
What's New in Equipment 18
Personal Mention 62
Supply Trade Notes 64
Helps from Manufacturers 66

Pennsylvania Railroad cl

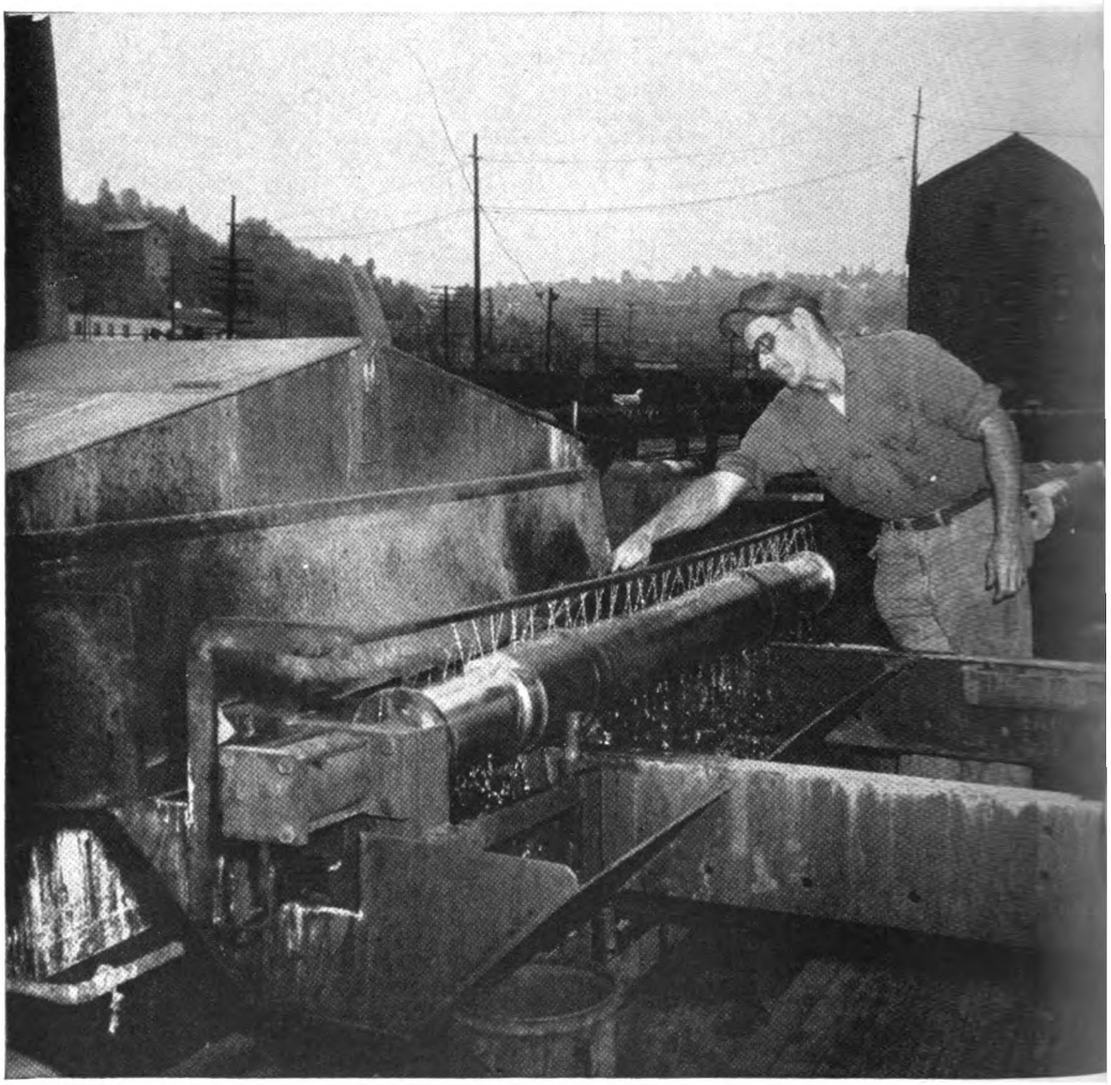
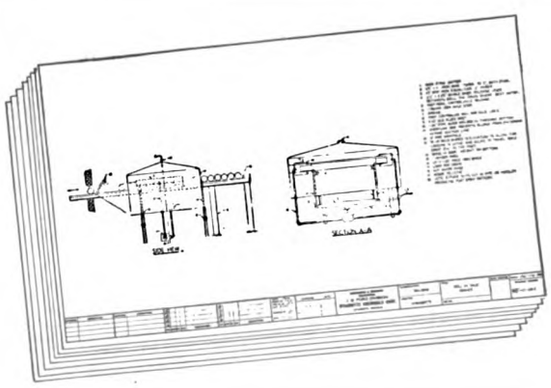


Photo shows axle in rinse position. The spray hood has a capacity of 8 to 10 axles, depending on si



Here are five typical Wyandotte blueprint
can help cut your cleaning costs. Consul
Wyandotte cleaning specialist for others.

1. **Diesel Engine Block Cleaning Tank**
2. **Diesel Engine Block Washer**
3. **Diesel Engine Spray Cleaning Setup**
4. **Diesel Truck Spray Washer**
5. **Spray Cleaner for Box and Hopper**

¦s at 1/3 the labor cost

/yandotte blueprint cuts costs by letting one man do the work of three

lvania Railroad, well-known for its eeping program, has done it again! at Pitcairn, Pa., used to clean journals ed axles with steam and petroleum g them dry with rags. Production rate axles per eight operator hours.
y more! Using a Wyandotte blueprint, d a Roll-In Axle Washer that requires rator, and the production rate is now les per eight operator hours.

Equipment shop-built

, the equipment was completely shop- from scrap. Here's how it works:
tor feeds unmounted axles under the by means of a transfer mechanism. nen sprayed with hot Wyandotte 11 rced by a motor-driven centrifugal roll out by gravity to the rinse position, one at a time. As one axle rolls out, another is transferred into the tank by the operator.

Many blueprints available

Many railroads have profited by using Wyandotte blueprints to install time-saving, money-saving cleaning processes. You can too! The list at the left shows some of the blueprints Wyandotte makes available to railroads—and there are many more.

But these blueprints are only a part of our systemwide service. Your Wyandotte cleaning specialist, assigned permanently to your line, can improve your cleaning in any local area or on a systemwide basis. If you are not taking full advantage of this service, get in touch with *your* Wyandotte cleaning specialist, or mail coupon today. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.*

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REPORT FOR AUGUST—*Continued from page 5*

mosphere may be expected in normal operation and can be checked by placing the bare hand against the frame adaptor. An overheated bearing would be one on which the hand could not be held for a few seconds. The end cap temperature may be considerably higher than the bearing temperature during the initial run-in period of synthetic rubbing type enclosure seals, and sh... be used as a point to check temp... If an overheated bearing is fou...

(*Continued on page 14*)

Coordinated Mechanical Associations Meeting September 15-17, Chicago

R. L. Dearmont, president, Missouri Pacific, will be the principal speaker at the luncheon of the Coordinated Mechanical Associations at noon on Tuesday, September 16, at the Hotel Sherman, Chicago. The luncheon honors all railroad presidents. Entertainment has also been arranged by the Allied Railway Supply Association for its membership during the time of the meetings, the tentative programs for which follow.

Locomotive Maintenance Officers'

MONDAY, SEPTEMBER 15

10 am

Address: Pres. F. R. Denney.

Address: T. T. Blickle, general manager-mechanical Atchison, Topeka & Santa Fe.

Report: Diesel Mechanical—Other than Engine.

2 pm

Report: General Diesel Maintenance Subjects.

Report: Shop Equipment.

TUESDAY, SEPTEMBER 16

9 am

Address: C. W. Taylor, director, Bureau of Safety and Service, ICC. Subject: Certain Functions of the Bureau of Safety and Service Affecting Locomotive Maintenance.

Report: Diesel Electrical.

2:30 pm

Visit to AAR Research Laboratory.

Visit to EMD.

WEDNESDAY, SEPTEMBER 17

9 am

Report: Diesel Engine Maintenance.

Report: Diesel Material Reclamation.

2 pm

Report: Steam Generator Maintenance and Water Treatment.

Report: Fuel and Lube Oil.

Railway Fuel and Operating Officers

MONDAY, SEPTEMBER 15

10 am

Address: Pres. O. D. Teeter.

Report of secretary.

Address: R. Knox Bradford, vice-president-traffic, D&RGW.

Safety, E. L. Duggan, system superintendent safety, AT&SF.

Employee Responsibility in Promoting Public Relations, Douglass Campbell, vice-president, NYC.

Progress of Oil-Burning Gas-Turbine Electric Locomotive.

2 pm

Joint meeting with Air Brake Assn.

Address: R. M. MacDonald, director of operation, Board of Transport Commissioners for Canada.

Panel discussion—Train Handling.

Budd Frate Brake—R. G. Stacy, Budd Co.

TUESDAY, SEPTEMBER 16

9 am

Radiation Studies of Fuels, Ray McBrian, director research, D&RGW.

Freight Loss and Damage Prevention. What it means to the railroads and the shipper.

Railroad Retirement—Social Security.

Panel discussion—Training Operating Personnel on Rule Compliance.

2:15 pm

Progress in Treatment of Fuel Oil.

Impending Legislation and Competitive Transportation Affecting Future of the Railroads, L. W. Horning, vice-president, NYC.

Panel discussion—Economical Utilization of Power.

Treating of Rails Chemically, G. W. Luvisi, manager products development, National Aluminate Corp.

WEDNESDAY, SEPTEMBER 17

9:30 am

Planned Supervision—Personnel Selection and Training.

Panel discussion—Diesel Troubles.

2 pm

Official business.

Duties and Responsibilities of an Operating Officer.

Air Brake

MONDAY, SEPTEMBER 15

10 am

Address: Pres. C. C. Maynard.

Address: A. Campbell, president, International Equipment Co.

Present Repair Track Maintenance Procedures—Montreal Air Brake Club.

Modern Air-Brake Shop Facilities, R. J. Dewsbury.

Limitations of Pneumatic Air-Brake Control, H. N. Sudduth, New York Air Brake Co.

2 pm

Joint meeting with RF&OOA.

Address: R. M. MacDonald, director of operation, Board of Transport Commissioners for Canada.

Budd Frate Brake—R. G. Stacy, Budd Co.

TUESDAY, SEPTEMBER 16

9 am

Basic Operating Characteristics Passenger Car Brake Equipment, St. Louis Air Brake Club.

Effects on Air-Brake Equipment of External Heat Applied to Railroad Equip... Thawing Frozen Commodities—Cen... Brake Club.

The Composition Shoe Contro... Modern Railroad Service, P. O. Wi... Westinghouse Air Brake Co.

Trends in Air-Brake Shop Fa... Manhattan Air Brake Club.

2 pm

EMD tour.

WEDNESDAY, SEPTEMBER 17

9 am

Elections.

Malfunctions and Remedies of A... Equipment—Pittsburgh Air Brake C...

Question Box.

Committee reports.

Car Department Officers'

MONDAY, SEPTEMBER 15

10 am

Address: Pres. H. L. Hewing.

Report: Committee on Construction, tenance and Upgrading Freight-Car ... ment.

Address: Speaker to be named

2 pm

Report: Committee on AAR ... Rules.

Report: Committee on Interchan... Billing for Car Repairs.

Report: Committee on Wheel-Sh... tices.

TUESAY, SEPTEMBER 16

9 am

Report: Committee on Light Rep... and Train-Yard Operation.

Address: L. L. Adams, assistant ... president, traffic, United States Ste...

Report: Committee on Maintena... Passenger Car Equipment.

2 pm

Report, Committee on Car Lubri...

Comments: W. M. Keller, vice-... (research), AAR.

WEDNESDAY, SEPTEMBER 17

9 am

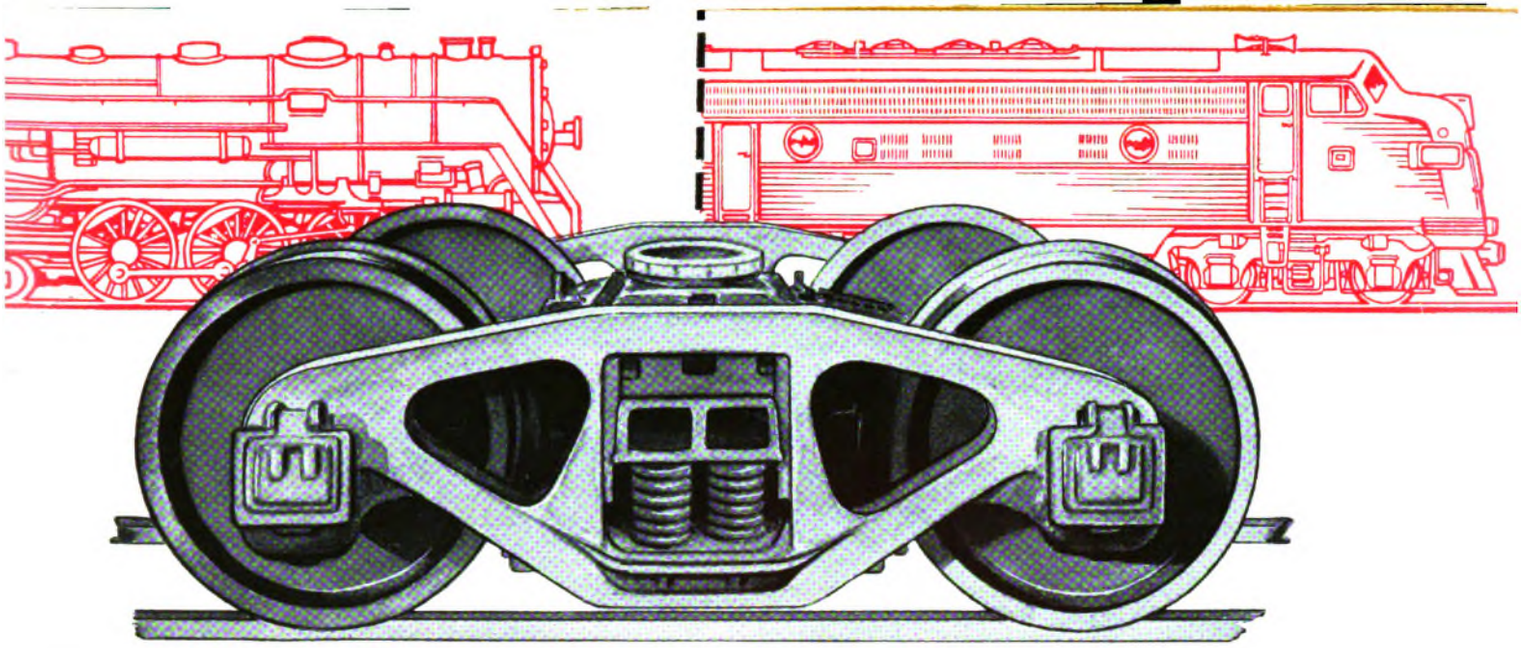
Report: Committee on Air-Cond... Equipment, Operation, and Mainten...

Report: Committee on Maintenan... Servicing of Mechanically Equipped R... erator Cars.

Report: Committee on Painting—... Methods in Finishing Railroad Eq...

Miscellaneous reports.

Election of officers.



'he Old and the New...

Great Step Forward!

th waste gradually being discontinued in jour- l lubrication, the change-over to a better type of ›ricator raises certain questions: what type ›uld it be; what qualities should it possess; what ıd of a performance should be expected of it? help you decide, consider what the JBS Acme bricator offers and compare it with any other ›ricator. JBS Acme alone has the exclusive all- ›ol quilted core* which retains many times its n weight in oil reserve. Heavy chenille loop pile rfaces assure an ample supply of filtered oil at times. JBS Acme Lubricators are unaffected by nperature changes and wick AAR specification r oil even at 45° below zero in road service tests. S Acme Lubricators require no modification of e standard journal box, are designed to hold eir position in the box, and assure better per- rmance with less servicing.

1957—Journal Box Servicing Corp.

*Patent applied for

JBS ACME JOURNAL LUBRICATORS

- ★ Retains oil up to 4 times its own weight
- ★ Requires no modification of journal box
- ★ Wicks AAR specification car oil even in coldest weather
- ★ Assures better performance with less servicing
- ★ Has exclusive all-wool quilted core*
- ★ Reinforced for extra wear
- ★ Cannot glaze
- ★ Readily reclaimed

GUARANTEED Quality, Workmanship and Material as represented

JRNAL BOX SERVICING CORP.

"30 Years in Car Lubrication"

SALES OFFICE: 332 S. MICHIGAN AVE., CHICAGO 4, ILLINOIS
RAL OFFICES: 1112 E. KESSLER BLVD., INDIANAPOLIS 20, INDIANA
FACTORY: DALTON, GEORGIA

REGIONAL SALES OFFICES:

ST. LOUIS, MISSOURI • CLEVELAND, OHIO
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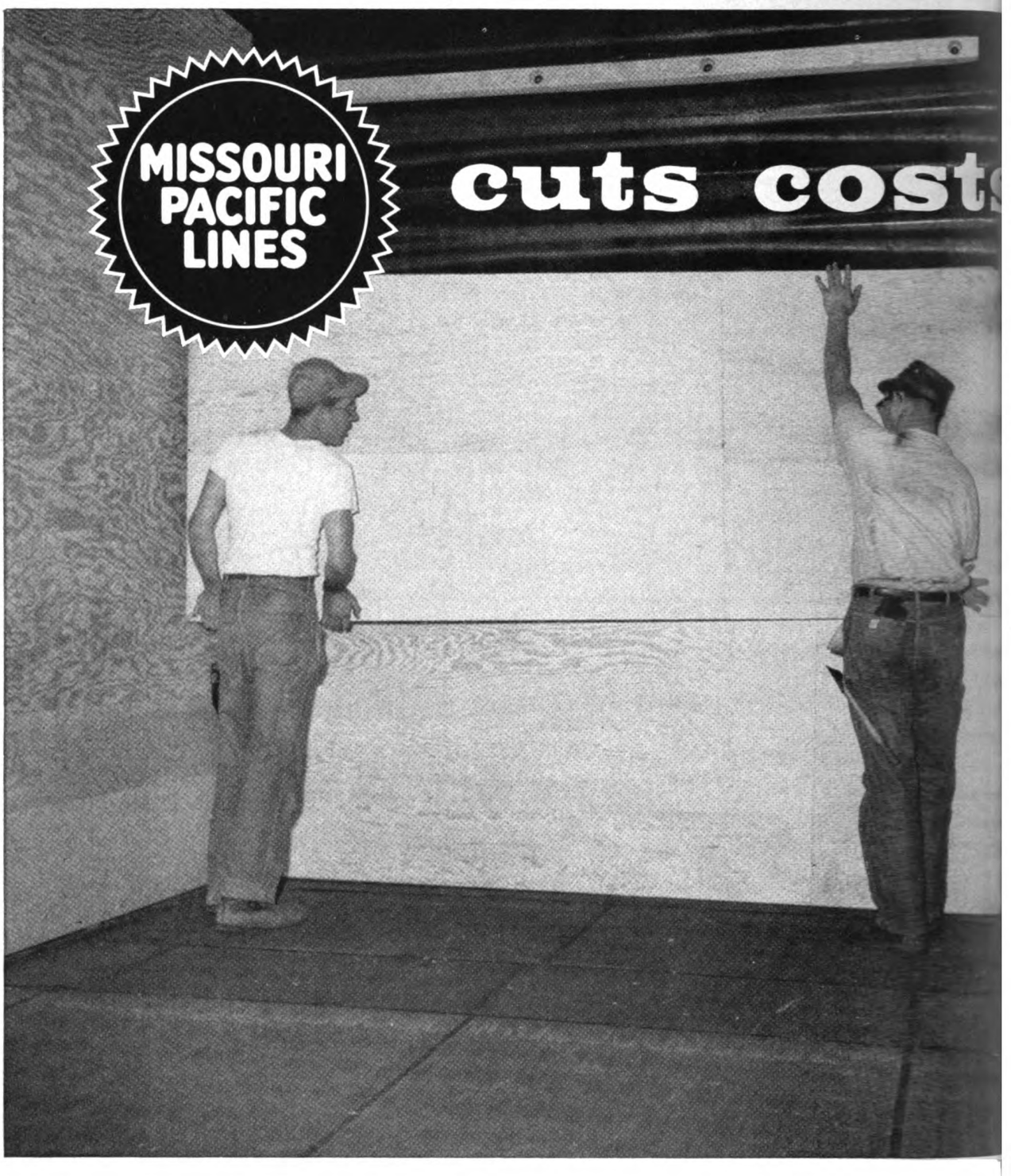
SAN FRANCISCO, CALIF. • MONTREAL, QUEBEC



Only Exterior Fir Plywood car lining has all these advantages:

LOW COST— Easy to install fir wood lining speeds work... save per cent and more in labor costs

›ith Fir Plywood oxcar lining

ssouri-Pacific reports Exterior plywood eeds work, saves 10 man hours per car

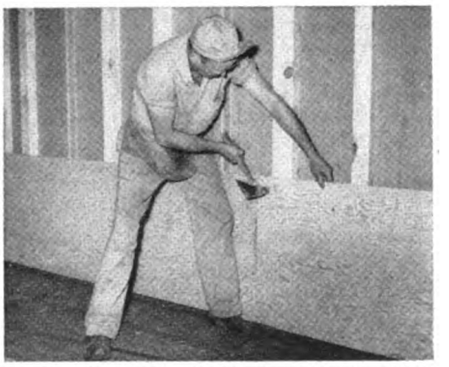
ERIOR FIR PLYWOOD car lining plays an important role in the fast-moving operation at Missouri-Pacific's construction yard eSoto, Missouri, where modern assembly line techniques can a new boxcar into service every hour of the day.

he in-place cost of the plywood car lining is less than T & G er, chiefly because it can be installed so much faster. Shop ials estimate that fir plywood saves over 10 man hours per 40- car. Total lining costs (including labor and materials) comes ss than $220 per car.

or Mo-Pac fir plywood has demonstrated its superiority in other s, too. Interior surfaces are smooth, and the danger of infesta- is minimized. Shippers like it because it's a clean (and easy-to- n) lining that protects valuable ladings. Waterproof Exterior wood is a strong, tough, rugged material capable of shrugging blows that would split ordinary lumber.

ver the long haul, too, fir plywood lining pulls its freight with er maintenance and longer life.

At their DeSoto shops, Mo-Pac does big things in a big way, *fast*. Specially developed high-speed assembly line technique sends 8 new boxcars into service every day.



Exterior plywood is nailed horizontally with ¾" fir plywood for side walls and 1" fir plywood for end walls. Crews use cement-coated nails with a special spiral thread for better holding power.

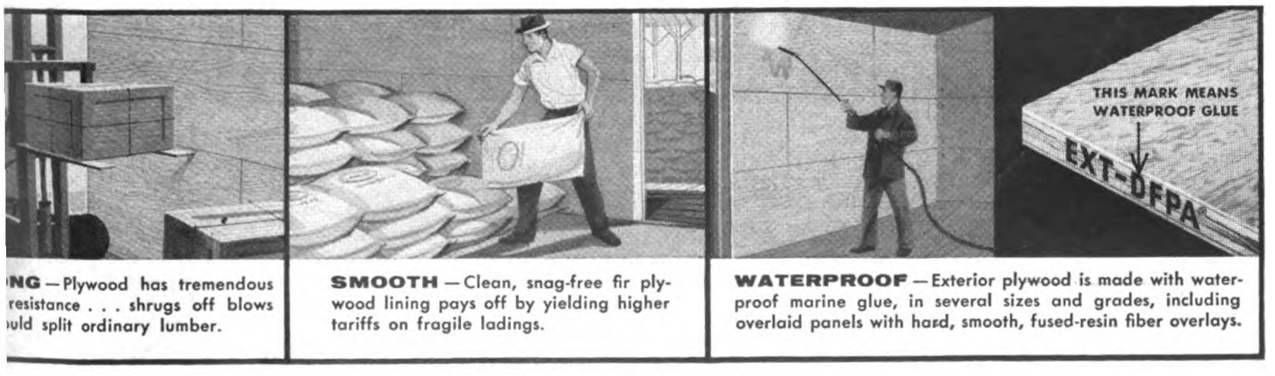
MORE INFORMATION about fir plywood–its uses, properties and advantages–write

DOUGLAS FIR PLYWOOD ASSOCIATION
TACOMA 2, WASHINGTON

industry-wide organization devoted to research, promotion and quality control

Always specify by DFPA grade-trademarks

DFPA TESTED QUALITY

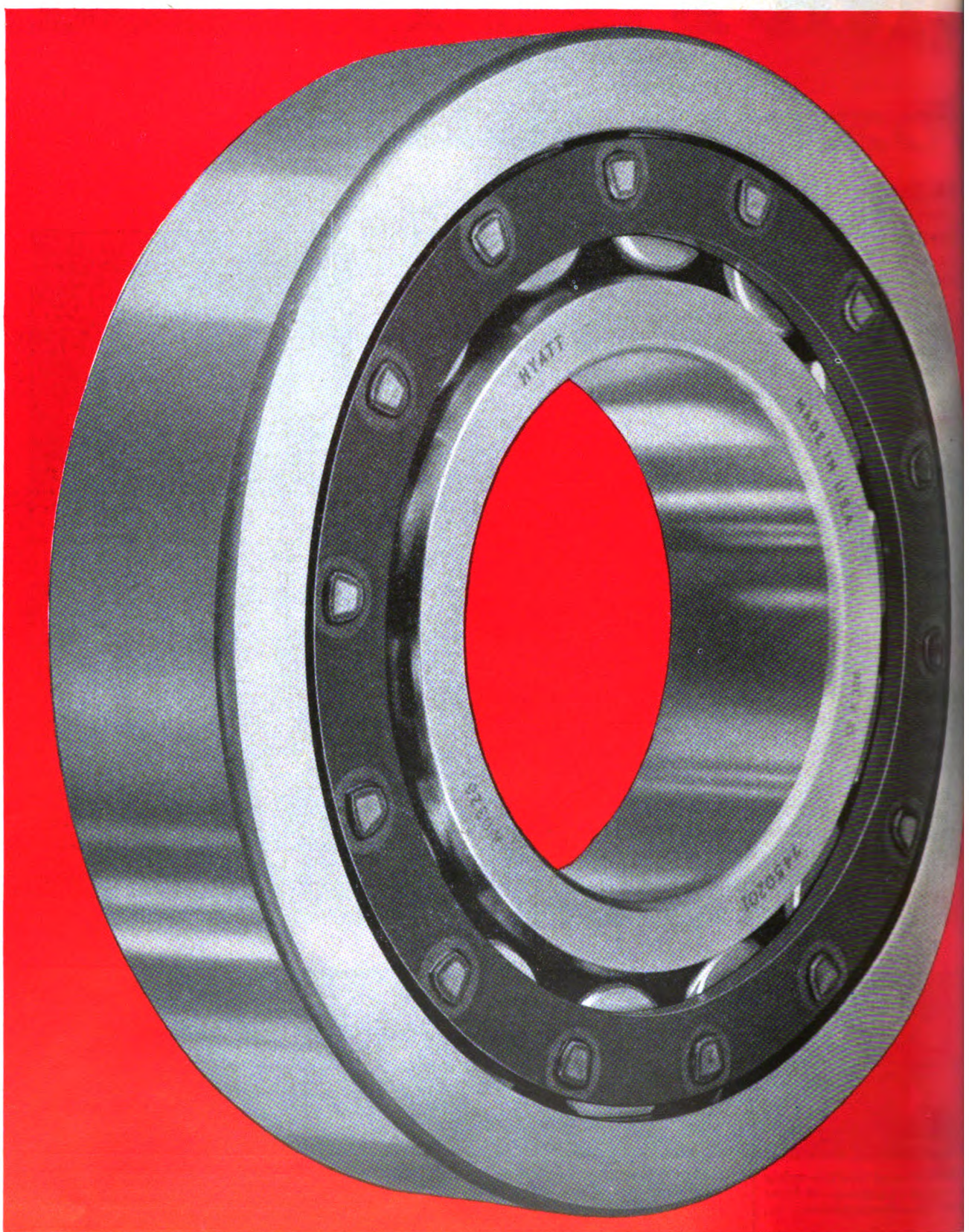


NG — Plywood has tremendous resistance . . . shrugs off blows uld split ordinary lumber.

SMOOTH — Clean, snag-free fir plywood lining pays off by yielding higher tariffs on fragile ladings.

WATERPROOF — Exterior plywood is made with waterproof marine glue, in several sizes and grades, including overlaid panels with hard, smooth, fused-resin fiber overlays.

New Pinion End Bearing

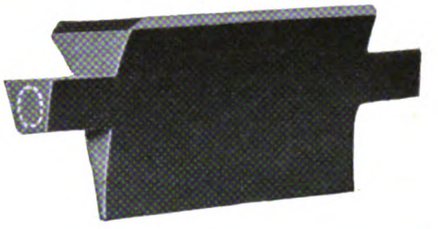


Extends Service Life !

*Traction motor performance improved through new type trapezoidal trunnion cage design**

Longer lasting. Secret of this new pinion end traction motor bearing lies in the unique construction of the steel roller cage. A roller riding cage bearing normally has an exceptionally long service life, but with the development of the trapezoidal trunnion cage, this bearing has an even longer life potential.

Twice the strength. Trapezoidal shape of the cage bar trunnion has 60% more metal than previous cylindrical trunnions. The trapezoidal trunnion fits to a conforming hole in the cage ring to form a solid, twist-proof cage that is at least twice as strong as any previous cage design.



Immediate delivery. The new trapezoidal trunnion bearing is available for immediate delivery from Electro-Motive's nine convenient on-line warehouses:

Los Angeles, Calif.	Minneapolis, Minn.
Berryville, Calif.	Halethorpe, Md.
North Salt Lake, Utah	Jacksonville, Fla.
Fort Worth, Texas	Robertson, Mo.

La Grange, Illinois (factory and parts center)

For remanufactured bearings, too. Save 25% over completely new bearings by having your worn-out flange-riding and roller-riding cage bearings brought up to brand-new standards through EMD factory remanufacturing service. With the new trapezoidal trunnion cage, these bearings will last much longer. Ask your Electro-Motive representative for complete details.

*Produced by Hyatt Division, General Motors.

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS

LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*

Canada: General Motors Diesel Limited, London, Ontario

GENERAL MOTORS LOCOMOTIVES

REPORT FOR AUGUST—*Continued from page 8*

AAR approved roller bearing grease should be applied unless the bearing has obviously been destroyed by overheating. In this case, friction bearing hot box coolant or "dope", or other available lubricant can be used to move car to a suitable set-off point.

2. *Visually inspect for damaged or missing parts.*—Observe the external appearance as compared to other assemblies on the cars.

3. *Visually inspect for proper seating of the frame adaptor on the bearing.*—All frame adaptors have downward projecting thrust flanges which centrally locate the frame adaptor on the bearing. Due to misapplication, it is possible to have the frame adaptor mislocated so that one of the frame adaptor thrust flanges is resting on the outside diameter of the bearing. This type misapplication can occur when assembling a truck, in rerailing a derailed car or when moving a truck by an overhead crane attached to the bolster or side frame instead of the wheels and axles.

Illustrations show the improper and proper seating of the wide frame adaptor which is used with the wide pedestal frame. A similar condition could occur on some other types of side frames having wide pedestal frame openings such as the Vulcan side frame. A narrow adaptor is used in both the narrow pedestal and integral box type side frames to adapt the same roller bearings to these frames as is used in the wide pedestal frames. The integral box frames could become misaligned on the roller bearings similar to the wide pedestal frames. It is necessary to look into the integral box to see if the frame adaptor is in its proper position.

Narrow pedestal frames are designed so that the narrow adaptor cannot be disengaged from the bearing under ordinary circumstances. Wrecks or derailments which might damage the retainer key in the pedestal leg of the frame could permit disengagement of the bearing and the frame adaptor.

The AAR requests these inspection requirements should be made available to all concerned who handle such equipment.

Repairs to Damaged Cars

The Arbitration Committee, on June 23, 1958, completed its investigation of Case 1855 involving the Illinois Central and the Consolidated Chemical Industries with regard to charges for damages in derailment of CCIX cars 1172 and 1200 on the Illinois Central. The derailment occurred on the IC on September 27, 1956, at Amite, La., and defect cards bearing notation "Home for Repairs" were issued authorizing bills for repairs to all unfair usage damage based on AAR rules and prices.

Consolidated Chemical Industries, the car owner, requested the cars to be forwarded to shops of Shippers' Car Line for repairs—CCIX 1172 to Smackover, Ark., and CCIX 1200 to Milton, Pa. This was done only after the Illinois Central advised Consolidated they could not make the repairs. After the cars were repaired, Shippers' Car Line submitted billing repair cards to Consolidated and billed them direct as follows: CCIX 1172, $3,521.64; CCIX 1200 $6,325.00—Total, $9,846.64

Consolidated, in turn, counterbilled the Illinois Central in these amounts. Audit of repair cards furnished the IC showed AAR allowances for repairs to be $2,305.73 for CCIX 1172 or a difference of $1,215.91; and $4,897.35 for CCIX 1200 a difference of $1,247.65, a total difference of $2,643.56 over and above the AAR allowances. Bills were returned to the car owner requesting the charges be reduced to the AAR allowances for repairs, at which time the bill for CCIX 1172 was reduced $765 because of error in preparation of Shippers' bills.

Consolidated Chemical Industries returned the corrected bills and insisted they be reimbursed by the IC in the amount of $9,081.64 ($9,846.64 minus $765.00). Under protest, Consolidated agreed to accept payment of $7,203.08, the maximum AAR allowance, and submit the matter to aribtration to collect the difference of $1,878.56. The IC having made payment on the basis of maximum permitted under the rules, joined in submitting the matter to Arbitration.

The Arbitration Committee, in its decision on June 23, sustained the contention of the Illinois Central. Subsequent investigation, concurred by both parties, showed the cars were traveling on mileage equalization. The AAR Interchange Rules, the committee said, provide the basis on which charges for repairs to damaged cars are to be made on authority of defect card.

Orders and Inquiries For New Equipment

Orders for 14 and 268 diesel-electric ... tives, respectively, have been place... the closing of the July issue. The *Mis... & St. Louis* will purchase 14 1,750-h... diesel-electric locomotives from Elec... tive Division of General Motors at a ... $2,640,000. Delivery will be made in O... The *Norfolk & Western* will purch... general-purpose diesel road switche... switchers at an estimated cost of $5... Some will be equipped for passenger ... Of some 262 steam locomotives now ... N&W, 202 will be retired by the end o... The remaining 60 will be used as ... power.

The *Chicago, Burlington & Quin...* build 100 40-ft 6-in. box cars with ... underframes and damage-free loading ... The road also will buy 100 covered ... from Pullman-Standard and 50 A... hoppers from General American Tra... tion Corp. Both types will have roll... ings. The *Chicago Great Western* ... five 50-ton Thrall insulated box ca... estimated cost of $14,000 each. *North... can* has purchased 20 2,003-cu-ft ... 2,893-cu-ft hopper cars from Pullma... ard. Approximate costs, $9,300 and ... each, respectively. The *St. Louis ... western* expected to complete constru... 50 70-ton pulpwood cars at its Pin... shops last month. Estimated cost, $...

Letters to the Editor

Pete's Popularity

Our series on mechanical refrigerator car trouble-shooting has proved to be popular. Pete will solve his next problem in our September issue. In requesting suggestions about this series, we received the following comments.

TO THE EDITOR:

The article "Timed for Trouble" was of special interest to me. Articles of this type appearing regularly and presented in such a manner can do as much for the service man as a formal training school.

John S. O'Neil,
Service Manager, Transportation Equipment, Carrier Corporation

---

These articles are prepared in a very interesting manner and certainly believe they will prove worthwhile and interesting to anyone in the railroad industry that may come in contact with mechanical refrigerator cars.

We think the series of articles should be continued, and, if we can furnish information at any time that will be helpful, we will be glad to do so.

G. P. Torburn,
General superintendent, Car Department Pacific Fruit Express Company

I have read these articles and th... have presented the subject in a uni... interesting way that would make the... tractive to anyone concerned in this pa... subject. The only adverse comment I ... make would be that the text is ... longer than it would have to be to ... the same information, and it is ... possible the reader would prefer to ... presented in a more concise form.

W. N. Messimer,
Manager-equipment,
Merchants Despatch Transportation C...

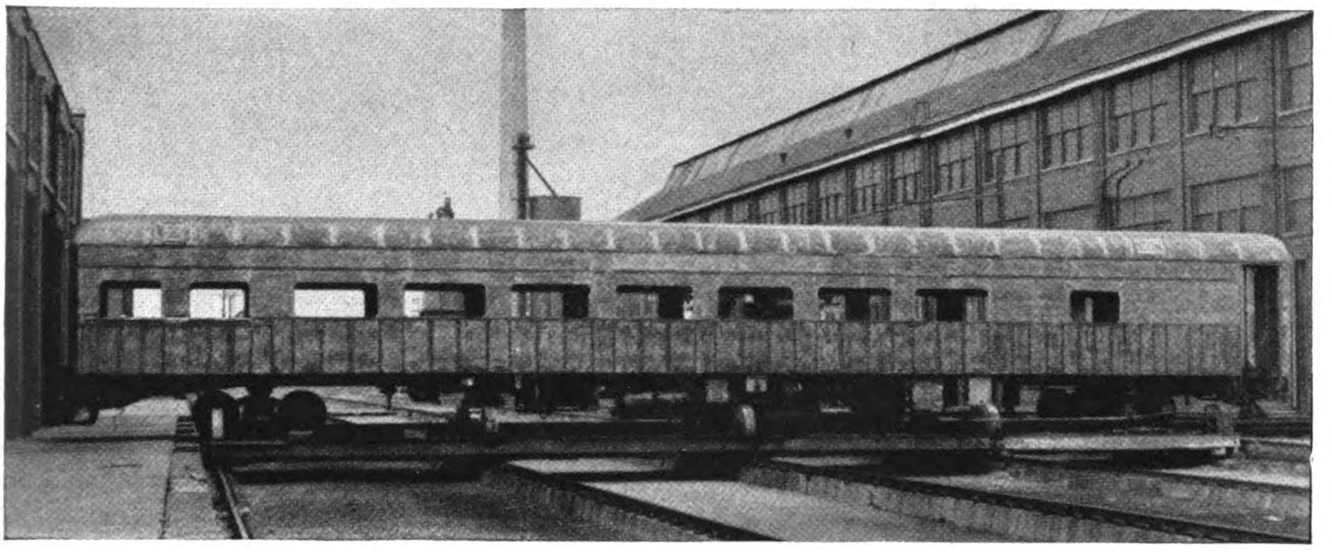
I think the articles will prove very ... while.

R. G. Setzekorn,
Mechanical superintendent
American Refrigerator Transit C...

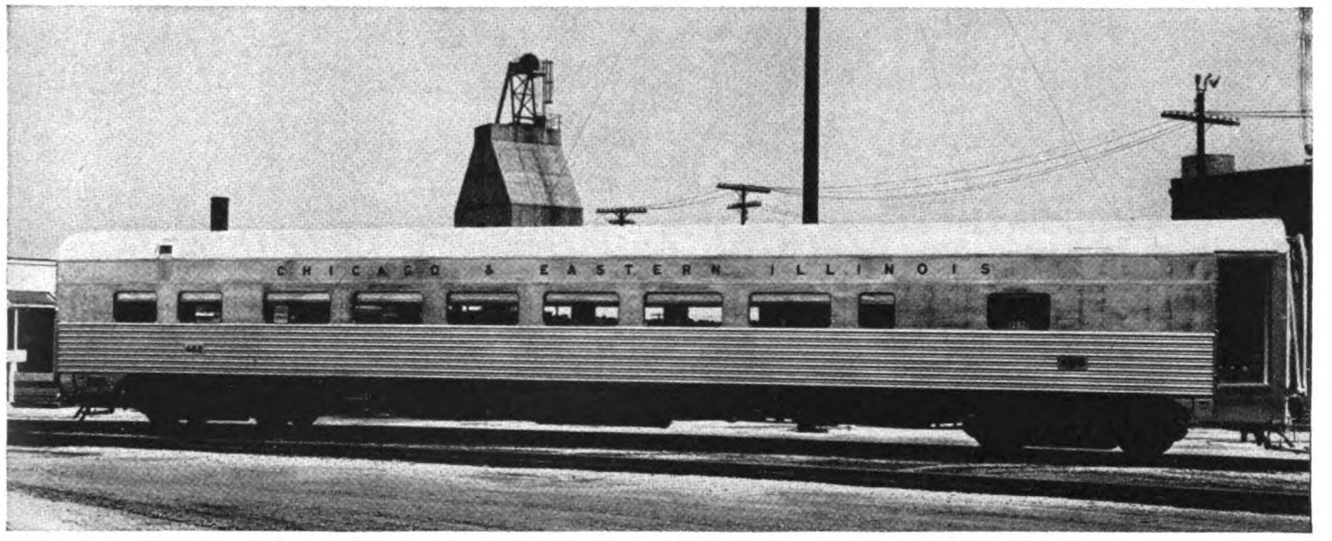
Everyone in our organization com... favorably on the way the article... written. They are certainly true to fa... should be of definite assistance to ... nance men as well as to those concern... design and engineering of such equip...

Paul W. Mantz,
Assistant sales manager, Railway P...
Waukesha Motor Company

(*Continued on page 62*)



At 1/8 of new-car cost, old cars are stripped...



"New-looked" with nickel-containing stainless steel

A low-cost "new look" with nickel-containing stainless steel has added many years of service to this and ten other passenger cars.

The 11 cars were rebuilt at the Chicago & Eastern Illinois Railroad shops for less than the cost of two new cars! That's why you'll want to consider such economical "face lifting" to give new life to your outmoded cars. Here's how C & EI did it:

The cars had painted steel sheathing (which required frequent repainting) above sills, fluted stainless steel siding below. First, they were stripped, inside and out. Next, undersurfaces were sandblasted, patched as necessary, given a protective coating. Last came the rebuilding. Smooth 20-gage 18-8 stainless steel was spot welded in place above sills, and the original fluted stainless, still in top condition, was reapplied below sills with Monel* nickel-copper alloy blind rivets.

Platforms, trap doors, and folding steps were rebuilt in nickel-containing stainless steel. New stainless sheathed door units and stainless wainscoting were installed.

There's good reason why nearly all new passenger cars are made of nickel-containing stainless steel. In structural members, for instance, its high strength-weight ratio enables designers to trim off deadweight. Its corrosion resistance, as in siding, has for many years cut maintenance costs. Car builders (and rebuilders) find that stainless steel's ductility and weldability permit fast, economical fabrication.

The booklet "Nickel Alloys in Railroad Equipment" describes how nickel-containing stainless and other nickel-containing alloys can lower costs, improve appearance and safety factors. Just write Inco for your copy.

*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N. Y.

INCO NICKEL

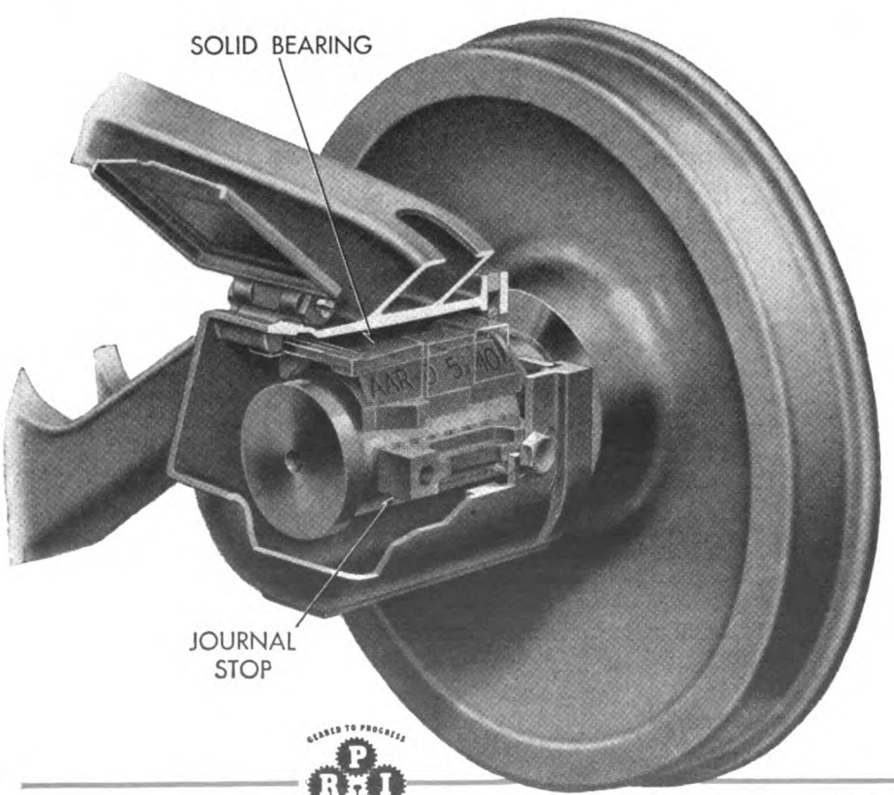
NICKEL MAKES ALLOYS PERFORM BETTER LONGER

HOW SOLID BEARINGS AND JOURNAL STOPS HELP K

It's a fact...

that MAGNUS R-S JOURNAL STOPS
can cut hot boxes 90%—
save 43% on total bearing operating co

Overall experience proves that Journal St
performance you wa



AAR SOLID BEARINGS

Simple
Dependable
Economical
Safe

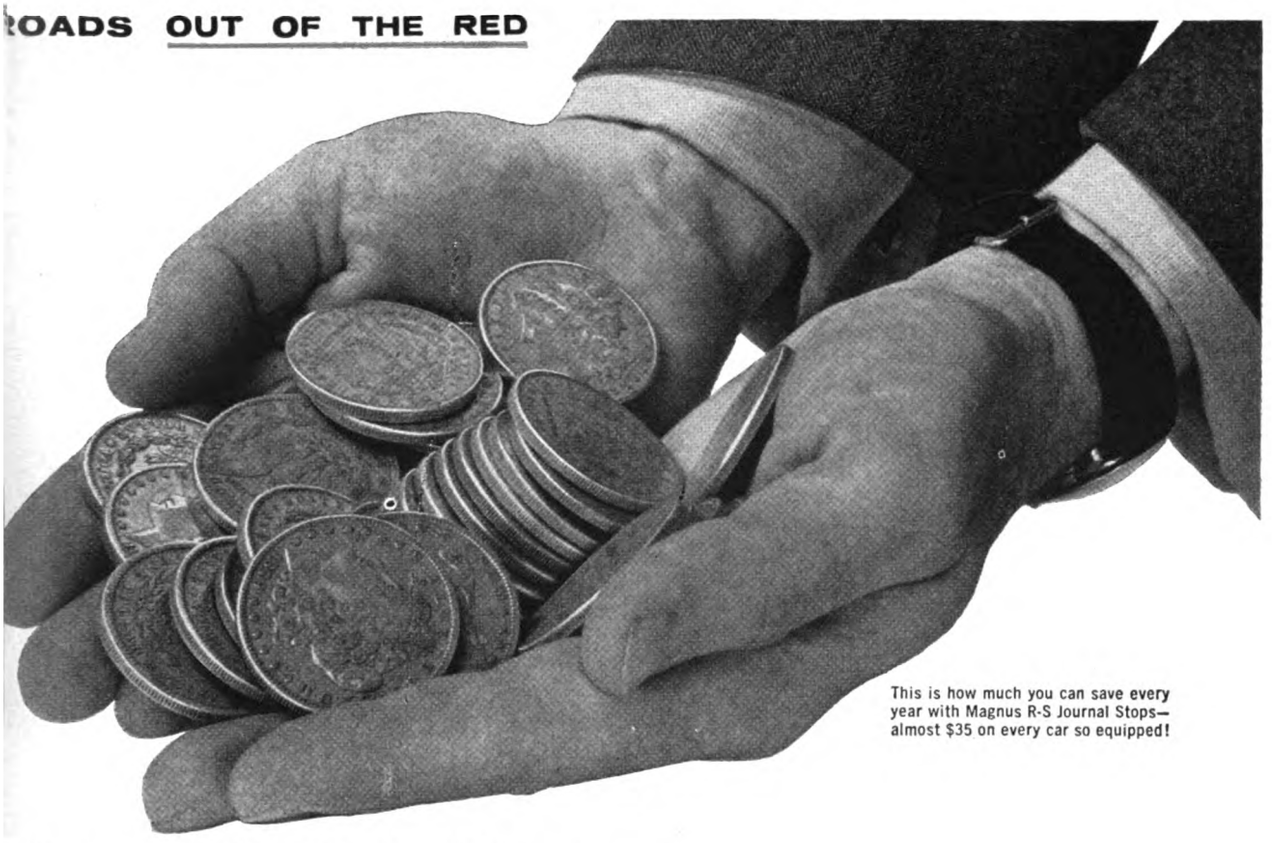
R-S JOURNAL STOPS

Permanent installation
Better bearing perform
Lower maintenance co

GEARED TO PROGRESS
P I
MEMBER

MAGNUS METAL CORPORATI

ROADS OUT OF THE RED



This is how much you can save every year with Magnus R-S Journal Stops—almost $35 on every car so equipped!

give you the kind of bearing pay for themselves in less than 3 years

R-S Journal Stops stabilize the entire journal bearing assembly. That eliminates 90% of the hot boxes - probably even more. You cut down the service attention required. Conservatively you double bearing and dust guard life. You reduce wheel flange wear and get more miles per axle too.

Right now you save almost $35.00 per car annually — pay the complete cost of the Stops, including installation, in less than three years. And bigger savings are sure to come. That's because R-S Journal Stops will help make possible a further extension of intervals between repacks. (Without Journal Stops the maximum extension won't be practicable). They'll make it easier to provide an effective rear seal, save on oil, still more on servicing.

Yes, R-S Journal Stops are the low-cost answer to hot boxes. And with them you still have all the many advantages that solid bearings bring to railroad rolling stock. You can take the maximum load, make the fastest schedule. Lading gets the smoothest ride. You save excess dead weight and get the lowest possible running resistance in pounds per ton. Best of all, with Journal Stops solid bearings can give the kind of performance you want at a price you can afford to pay.

Write us for *all* the facts . . . Magnus Metal Corporation, 111 Broadway, New York 6; or 80 East Jackson Boulevard, Chicago 4, Illinois.

MAGNUS

Solid Bearings

RIGHT FOR RAILROADS
. . . in performance . . . in cost

ary of **NATIONAL LEAD COMPANY**

Cutting Torch

The Arcair torch, a tool combining an electric arc and ordinary compressed air to melt metal and blast it out of the electrode path, is used for casting cleaning operations by Griffin Wheel. Equipment for the job consisted of a foundry model Arcair torch with ⅜-in. and ½-in. Copperclad electrodes, a Miller SR 400 Duplex rectifier type d-c welder and regular shop air at 95 psi.

Griffin has also employed Arcair in preparing used wheels for remelting. Because Arcair does not depend upon oxidation, the process works on those metals which do not oxidize readily, as well as on those that do. The Arcair process introduces less heat than any of the welding processes so that the physical properties of alloy steels, such as manganese, are unaffected. *Arcair Company, Dept. RLC, 447 S. Mt. Pleasant ave., Lancaster, Ohio.*

Journal Lubricator

The Armstrong lubricator is a specially woven wool-and-cotton pad attached to a light spring-steel frame. The pad is formed to fit the contour of the journal and is woven to insure only the points of the pile touch the journal surface. It is said to retain its shape throughout its entire life. Cotton wick feeders are woven into the pad so that after coming through the pad foundation they lie between the rows of the pile. The oil flow is metered and controlled by the type and number of wicks, which feed a continuous supply of oil to the pad. The wicking filters clean the oil so dirt and grit cannot reach the lubricating surface. One-third of the journal area, including the fillets, is always running in oil. According to the manufacturer, because there is no pumping action, no oil is lost through the rear of journal box.

Self-lubricating phenolic moulded buttons are imbedded in the pad surface and no amount of top pressure can impede oil circulation. These buttons, which cannot mark the journal, are said to prevent pad from glazing under any conditions. The springs hold the pad against the journal at correct pressure. They fit the bottom of journal box and cannot climb the sides.

The manufacturer claims that bearing temperatures remain fairly constant throughout temperature extremes. Also there is no displacement of the lubricator, linting or damage to pad in breakaway when frozen in subzero temperatures and no displacement of lubricator on impact. The Armstrong lubricator has been approved by the AAR for test applications. *Scullin Steel Company, Dept. RLC, St. Louis 10, Mo.*

Caboose Power Supply

This packaged power system for cabooses consists of a one-piece, 90-lb unit—alternator, regulator, and rectifier. They are pre-assembled and pre-wired at the factory, eliminating special mounting plates or brackets. The caboose battery and power supply are connected in parallel. The power supply is axle-driven and works through a Dayton endless Cog-Belt and drive system. The unit is normally mounted on the deck, inside the car.

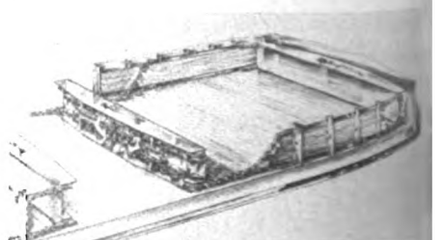
A 10 to 1 drive ratio with 36-in. wheels will permit charging to start at approximately 5½ mph. Full output is reached at 11 mph, and a steady 72 amp will be delivered from 11 to over 80 mph. *General Electric Company, Dept. RLC, Schenectady 5, N.Y.*

Transportation Insulation

Fiberglas Sealed-In Transportation Insulation is completely enclosed in polyethylene which protects against water soaking in refrigerated equipment normally cleaned by hosing. The polyethylene film is tough and will last indefinitely. According to the manufacturer, a recent inspection revealed nails had been driven through the polyethylene, but that water had not penetrated to the insulation.

The insulation is high in thermal efficiency. It was installed in a General American refrigerator car on December 1, 1955, and when removed and inspected on July 16, 1957, was in excellent condition, with the fresh, clean appearance of a new installation, with little evidence of slumping and/or water damage.

The insulation, which is odorless, is fabricated to fit the space. Its flexibility gives thermal tight butt joints and seals against the sides and around bracing arms, eliminating the need for cementing joints and seals. *Owens-Corning Fiberglas Corporation, Dept. RLC, Toledo 1, Ohio.*



Cushioning Device

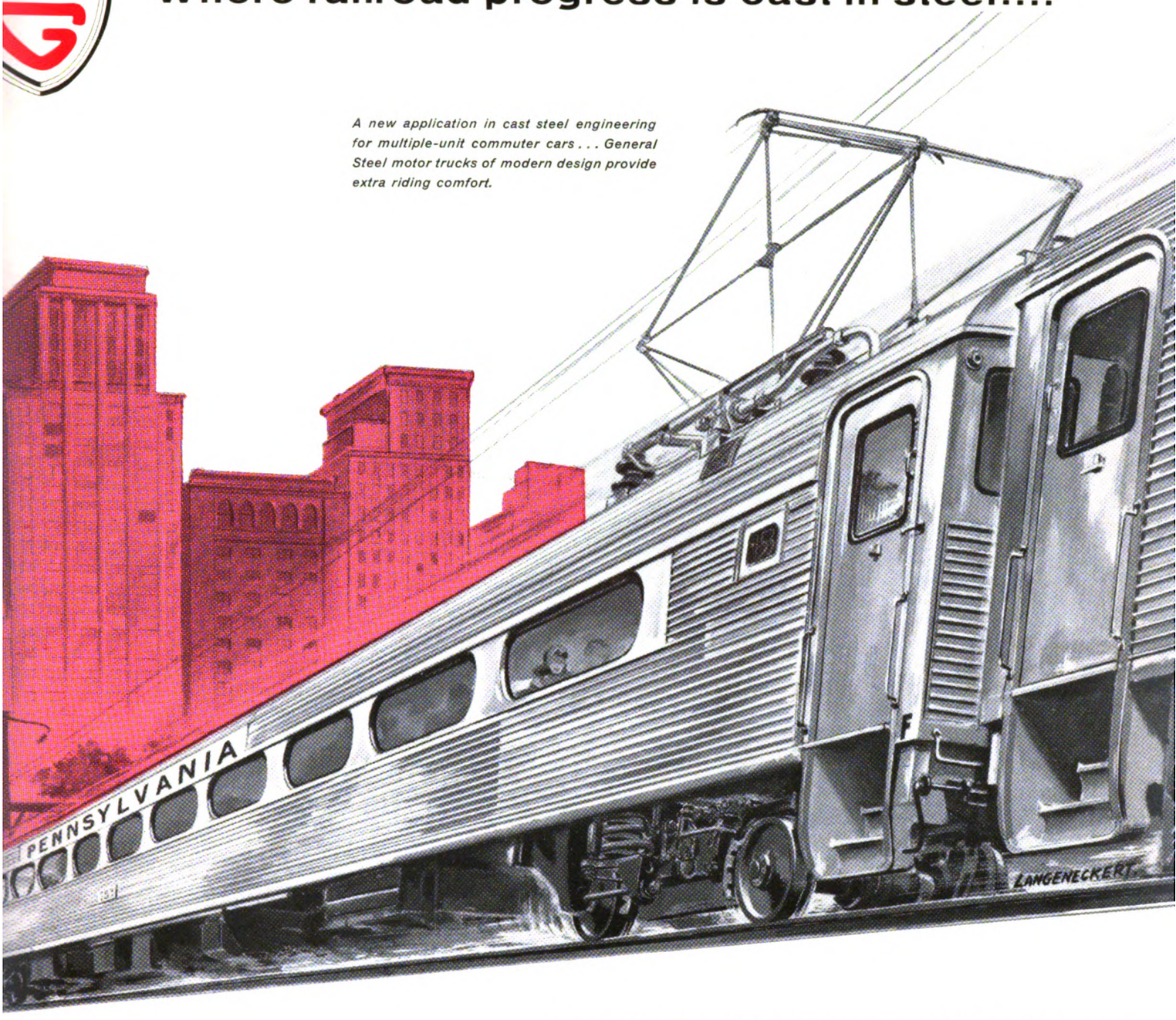
This cushion chain load restraining device has been developed jointly by Brandon Equipment and the Elgin, Joliet & Eastern for handling palletized tin plate in box cars and coiled plate on flat cars.

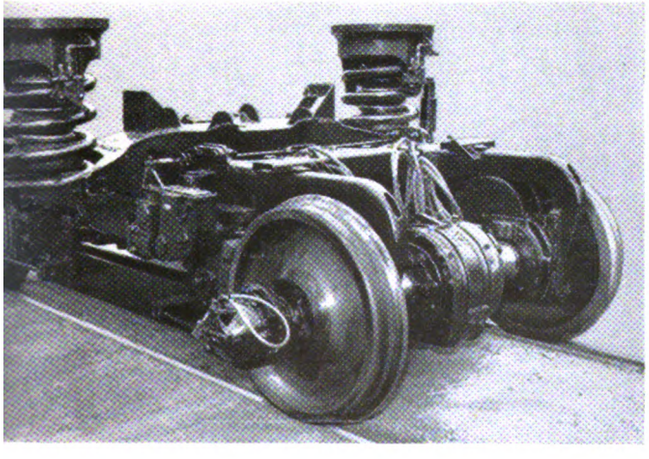
The box car equipment consists of steel straps welded to the vertical structural members in the sides of the car. Chains per-

(*Continued on page 54*)

Where railroad progress is cast in steel....

A new application in cast steel engineering for multiple-unit commuter cars . . . General Steel motor trucks of modern design provide extra riding comfort.





General Steel constantly finds new applications for proved designs in cast steel.

Through such creative engineering, the company has earned its reputation as the unique supplier of cast steel products for progressive railroads and other industries throughout the world.

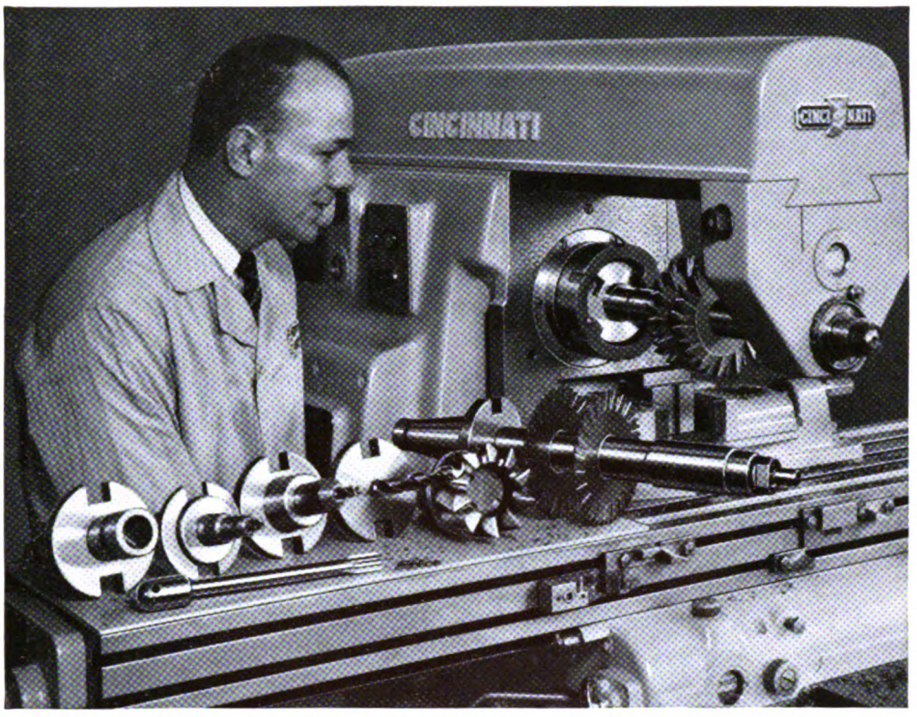
Specify General Steel products . . . proved by performance to be your wisest investment.

Latest cast steel design 4-wheel motor truck for use on multiple-unit commuter cars is based on tested and proved engineering principles. Combination air-coil bolster springs automatically maintain constant platform and coupler height, with coil springs supporting light weight of car and air springs supporting passenger load. Central Bearing subdues lateral shimmy and eliminates side bearing upkeep . . . increases mileage between wheel turnings and cuts maintenance costs.

GENERAL STEEL CASTINGS

GEARED TO PROGRESS P R I MEMBER

GRANITE CITY, ILL. · EDDYSTONE, PA. · AVONMORE, PA.



Dial Type convenience and ease of control is a big factor in producing multiple operation work at low cost.

CINCINNATI Plain Dial Type Milling Machine. Also Universal and Vertical styles. Built in Nos. 2, 3 and 4 sizes, 10, 15 and 20 hp. Catalog No. M-2003.

ARBOR-LOC is a big timesaver in interchanging the seven cutting tools on the table of the CINCINNATI Dial Type Milling Machine shown at the left.

EASY DOES IT

. . . for Dial Type Operators

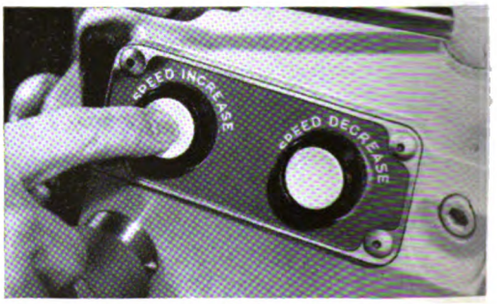
Ask the man who runs one. He'll tell you that CINCINNATI Dial Types are easy and convenient to operate and set up, and they help him maintain high quality . . . important considerations in low cost of production. Three operator-approved features of convenience are illustrated here.

Others include:

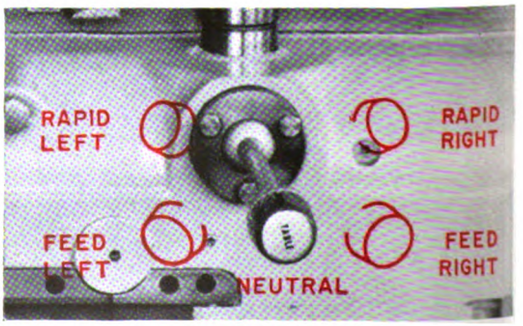
Automatic backlash eliminator for milling to the right or left . . . Power selection of 32 feeds . . . Independent directional control levers, with palm-fitting plastic knobs . . . Identification discs on all control lever knobs . . . Dynapoise chatter-damping overarm, automatically damps out chatter and improves finish on the work . . . Complete rear controls (plain and universal styles)

More information in our new comprehensive catalog No. M-2003. And if you must justify replacement, ask for a copy of our manual No. M-1838.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



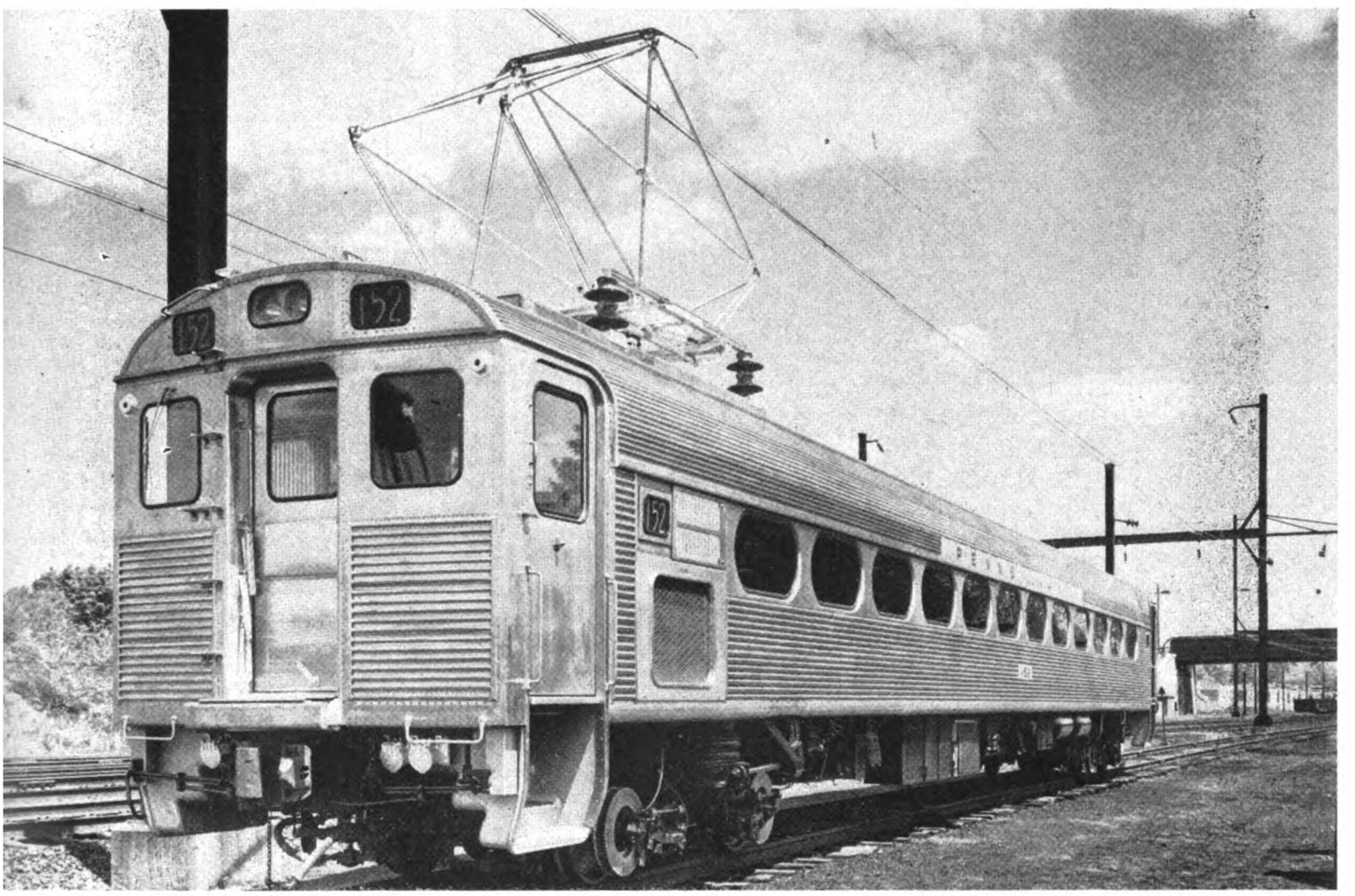
Push-button selection of 24 spindle speeds, throughout 16 to 1600 rpm range (18 to 1800 rpm for No. 2 Dial Types).



Five-position lever gives the operator complete one-hand control of the table (automatic cycle machines).

CINCINNATI®

Knee Type Milling Machines • Bed Type Milling Machines • Die Sinking Machines Cutter and Tool Grinders



Pioneer with Budd trucks weighs 90,100 lb. Truck centers are 59 ft 6 in., and coupled length is 85 ft. Pantagraph working height varies from 25 ft 9 in. maximum to 15 ft 1 in. minimum. Polyester plastic is used for steps and battery boxes.

Budd Pioneers Go into Pennsy M-U Service

Tested lightweight car design has been equipped with traction equipment for electric suburban service.

PIONEER III went into revenue service for the first time in July. Two years after Budd unveiled this lightweight car design (RL&C, August 1956, p.49), the Pennsylvania began operating them in multiple-unit suburban service. The six cars just delivered to the Pennsy are the first Pioneers to be built with electric traction equipment. They are also the first railroad-owned cars of this type. Until now, only the original Budd prototype unit has been undergoing tests in the U.S. and Canada. This first Pioneer III has accumulated over 120,000 miles of high-speed, main-line operation.

Budd's lightweight car concept called for the longest possible body units, retention of the four-wheel truck, standard couplers and standard coupler height. Greatest departure was supporting the carbody at the side sills through air springs which made possible a single truck and body bolster, and a completely new truck design. The load path in the Budd-designed truck for these cars goes directly from the side sill to the bolster end through the air spring and then to the truck side frame through Teflon side bearings.

The bolster of this truck is hollow and forms a reservoir for the air springs mounted at each end. Orifices meter flow between the springs and the reservoir to control sway and vertical oscillation. The direct load path eliminates the center plate as a load carrying member. Instead it serves as a pivot and tram point for the two side frame assemblies. Inboard Timken axle bearings are mounted in rubber rings at the ends of these hollow, welded side frames.

Above: Roofs and walls of these stainless steel c bodies are insulated with 2½ in. of Aerocor. Tinte glass installed in polyester plastic unit, form window frame and half of each adjacent pier pane Plastic panels, each two bays long, form ceiling an sides of overhead air duct.

Left: Flip-over seats have stainless backs, plas cushions and upholstery. Bulkheads and lower side are lined with ⅛-in. melamine-faced plastic an floor covering is vinyl-asbestos tile.

Three cars have this Budd truck. It was designed originally for the installation of traction motors and is fitted with them for this application.

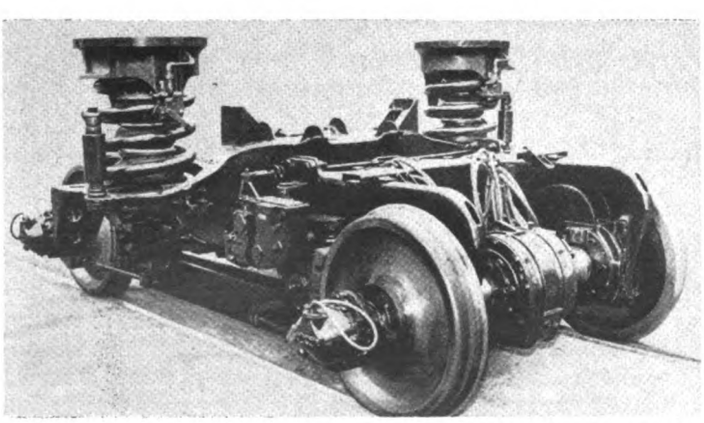
The other three cars are equipped with a newly designed General Steel Castings inboard-bearing truck. It incorporates equalization and a one-piece truck frame. The frame is supported by equalizer coil springs to minimize the unsprung weight. The cast steel frame also aligns the axles. The load of the carbody is carried by combination air and coil springs with the coil springs carrying the weight of the car and the air springs compensating for variations in passenger load. These springs are supported by a truck bolster swivelled at the truck frame through the GSC central bearing.

The new cars were not built to be operated in multiple unit with the Pennsy's existing electric equipment. They must, however, operate at the same high-level station platforms. While the original Pioneer III design does have standard couplers and coupler height, the vestibule platforms are about 12-in. lower than standard. On the new cars, the entire carbody has been raised about 1 ft. The underframe construction then had to be altered and strengthened because of greater coupler eccentricity. This underframe finally resembles that of an RDC even to its low-alloy, high-tensile welded end-underframe units. All of the changes add about 700 lb to the underframe weight.

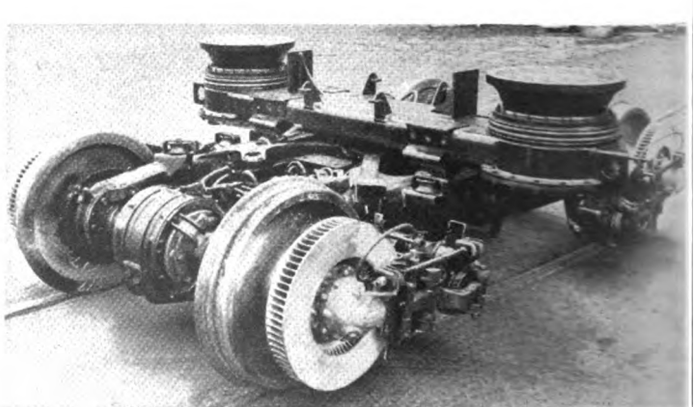
All cars have control stations at both ends. Providing these vestibules at each end is another departure from the original Pioneer III design. The cars are equipped with a Westinghouse 26-MU brake system, in which the brake cylinder pressure is varied with the passenger load. Each car has a Westinghouse 3-YC, 20-cfm air compressor, driven b a 6-hp d-c motor. The cars with the Budd trucks have outboard disc brakes The cars with GSC trucks have Westinghouse package tread brake units with Cobra shoes. Retardation rate in emergency is 2.5 mph per sec.

The Westinghouse Electric traction equipment is capable of accelerating a fully loaded six-car train to a balancing speed of 90 mph on level track. Acceleration of these fully-loaded cars is 1.2 mph per sec. Eighteen control steps provide this acceleration.

There are three running positions. In switching position, the four motors with shunted fields are connected in series to provide starting tractive force. In the series running position, the motors operate full field and resistance is cut out in seven steps. In the full-speed position, motors are reconnected by a bridging transition to series-parallel. When all



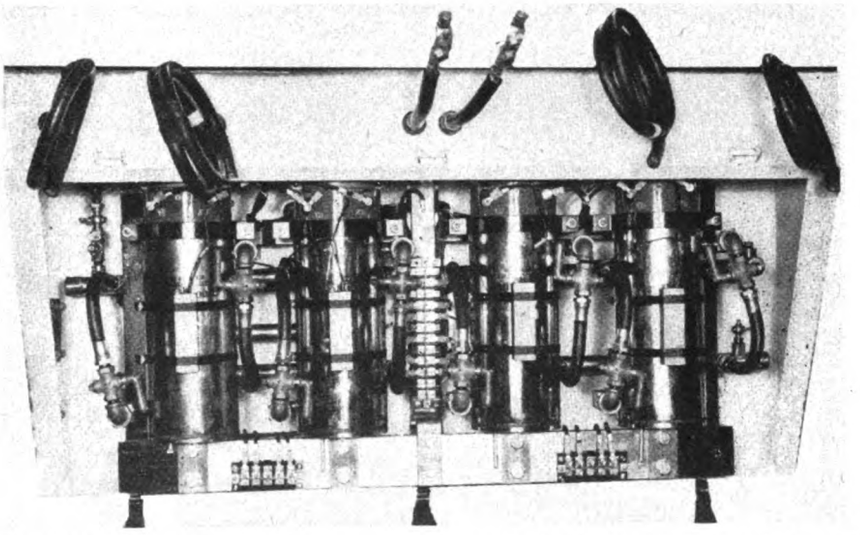
General Steel Castings inboard bearing truck is equalized and has rigid one-piece frame which provides positive alignment for the Timken tubular axles. Combination coil and air springs, supporting car body at side sills, are arranged so weight of light car is carried on coils and passenger loads are leveled with air springs. These 13,750 lb trucks have Westinghouse package brake units.



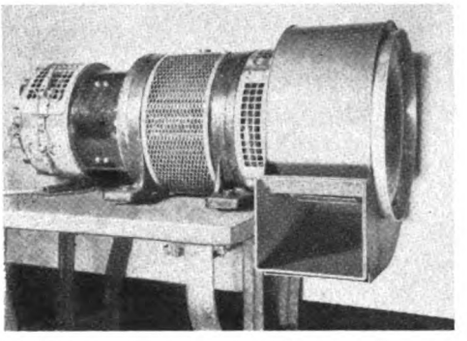
Budd lightweight truck has changed but little as a result of two years of road tests. For the first time this Firestone air-spring truck is fitted with traction motors. Outboard disc brakes are of double-surfaced, finned type. While three cars have this truck, all have 30-in. wheels, Timken roller bearings, Westinghouse traction motors, and Spicer hypoid drive units. Truck weighs just under 6 tons.

Partial List of Suppliers

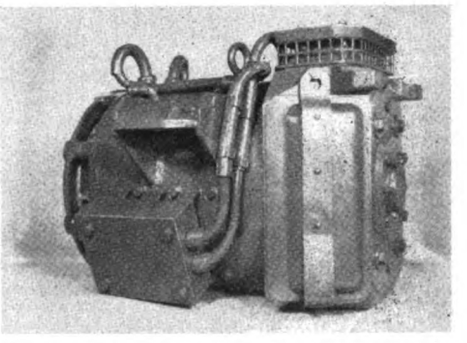
ear drive units	Spicer Mfg. Div., Dana Corp.
urnal bearings and tubular axles	Timken Roller Bearing Co.
ock absorbers	Houdaille Industries
und deadening pads	Fabreeka Products Co.
uck castings	General Steel Castings Co.
uck springs	Crucible Steel Co.
	Firestone Industrial Products Co.
heels and wheel assemblies	Standard Steel Works Div., Baldwin-Lima-Hamilton
ir brake equipment	Westinghouse Air Brake Co.
and brake	National Brake Co.
ir conditioning equipment and lighting	Safety Industries, Inc.
atteries	T. A. Edison Industries, McGraw Edison
rive couplings	American Flexible Coupling Co.
eaters and controls	Vapor Heating Corp.
umpers and receptacles	Pyle National Company
raction equipment	Westinghouse Electric Corp.
oupler and yokes	National Malleable & Steel Castings Co.
raft gears	Waugh Equipment Co.
nd underframe units	Youngstown Steel Car Corp.
ilters	Air Maze Corp.
lazing rubber	Inland Div., General Motors Corp.
rilles	Barber Coleman Co.
landholds	Railway Specialties Corp.
lastic-faced panels	U. S. Plywood Corp.
enta-treated plywood	Joslyn Mfg. & Supply Co.
inyl-asbestos floor tiles	B. F. Goodrich Co.
inyl-covered aluminum	Met-L-Wood Corp.
Window glass	Pittsburgh Plate Glass Co.
ag racks	Adams & Westlake Co.
urtains	Pantasote Co.
eats	Coach & Car Equipment Co.
eat cushions	Goodyear Tire & Rubber Co.
eat upholstery	U. S. Rubber Co.
aint	Sherwin-Williams Co.



Four Westinghouse Ignitrons are mounted in an enclosure attached under the center sill. Two pairs of these rectifiers, each connected in parallel, take 780 volt a-c from separate taps on transformer secondary. The 650 volt d-c output side has two reactors which limit current ripple to point where good commutation is obtained on traction, air compressor, and air conditioning motors.



Blower-generator-pump set driven by 234 volt induction motor provides ventilating air for rectifier radiator, main transformer and reactors. Water pump circulates cooling water through rectifier tubes. Cumulative compound generator produces 45 volt d-c.



Traction motors, four per car, are 300 v d-c, series wound, commutating pole type. Each two-bearing, self-ventilated motor is directly connected to its Spicer hypoid gear drive unit through a flexible coupling. Motors are mounted on car centerlines.

esistance is cut out, the motors are hunted to provide maximum speed. Acceleration is automatic under the control of the current limit relay.

Alternating current at 11,000 volts is aken from the catenary and fed to an nerteen-filled, 418-kva transformer with 1,560-volt secondary. Five secondary aps supply the various car circuits. Four gnitron rectifier tubes, two pairs in arallel, are fed from two separate 780-olt a-c power circuits. Their 650-volt l-c output supplies the traction motors, he 3-kw motor alternator for 115-volt -c fluorescent lighting, and the motor n the air compressor and air-conditioning equipment.

The cars are heated with 624-volt -c power taken from a separate tap. Control equipment and other auxiliaries re powered from a 234-volt a-c circuit. This a-c power is converted to 45-volt l-c in a blower-generator-pump set. The 75-amp-hr Edison battery is charged rom the output of this m-g set. Cooling nd heating controls, headlights and cab ights, and cab signal equipment, are lso arranged for this nominal 32-volt l-c operation. A new feature in the d-c generator control is use of a silicon rectifier as a blocking diode to prevent the battery from discharging into the generator and operating it as a motor when the blower-generator-pump set is shut down. The blocking diode replaces a relay and contactor used on the older cars.

By adopting the three-two seating arrangement, it has been possible to accommodate 125 passengers on each of the three cars which have toilets, and 128 passengers on the cars without toilets. The seats are on 32-in. centers. They are special lightweight "flip over" units with Pliofilm cushioning, Trilock covering, and stainless steel frames and backs.

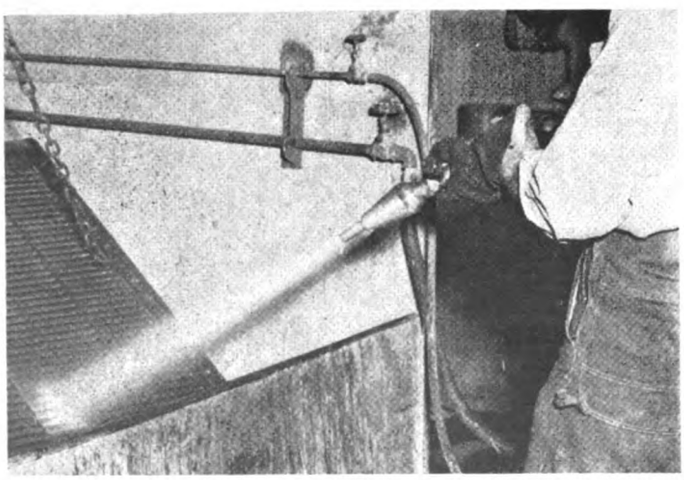
Each car is heated by strip-type wall-mounted electric resistance units of 20-kw capacity combined with a 24-kw overhead unit which is part of the air-conditioning unit. The eight-ton Safety Industries air-conditioning system circulates 2,400 cfm, of which approximately 25 per cent is fresh air. For capacity control, the cooling coil is split horizontally.

While the air-conditioning condenser and compressor of the original Pioneer III were a-c powered and could be mounted in a locker at B-end of the car, the new cars have the compressor resiliently mounted beneath the car and driven by a 13.8-hp, 650-volt d-c railway-type motor. The air-cooled condenser is mounted in the locker and cooling air is drawn through an inlet grille in the car side and discharged through an opening in the car floor.

Ignitron m-u cars combine the advantages of high-voltage a-c transmission with the superior characteristics and lower maintenance of d-c traction motors. The reliability of this type of equipment has been proven by 100 Ignitron m-u cars in service on the New Haven for the past four years. On these latest units, for the PRR, the car bodies, fittings, trucks and electrical equipment have all been designed for long life and low maintenance.

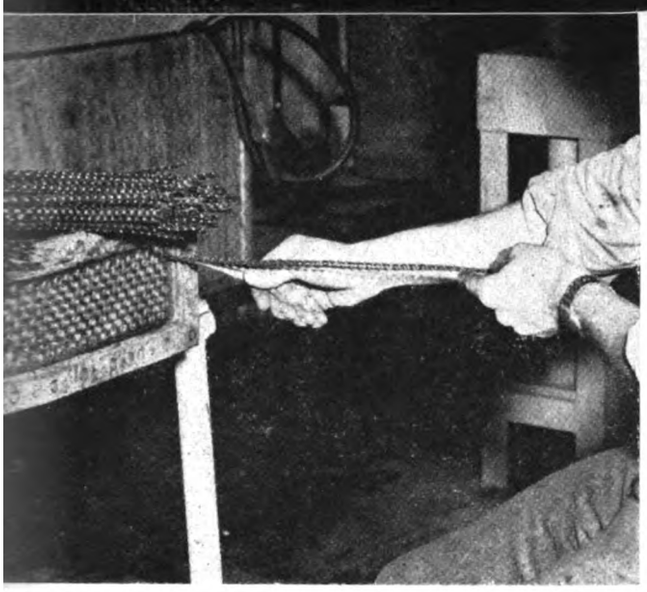
Stripped down radiator gets hot cleaning bath for 10 min to remove dirt and grease deposits.

Here's How the Frisco Overhauls

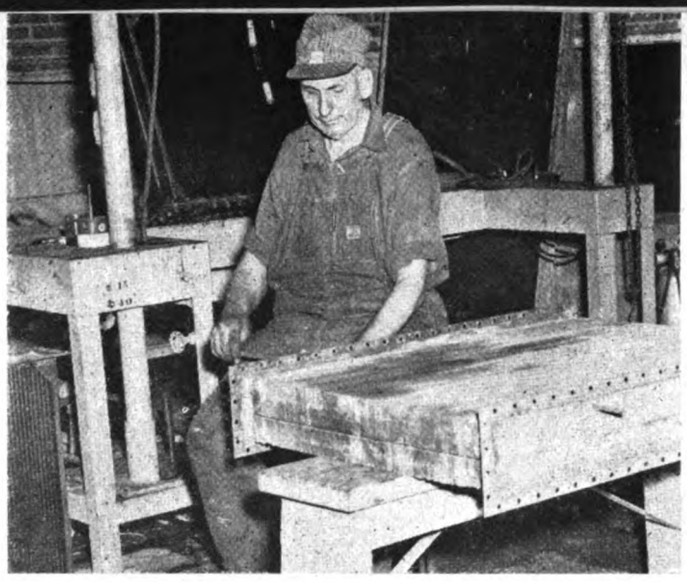


Hot water and steam complete cleaning in adjacent special stall. Overhead crane facilitates handling.

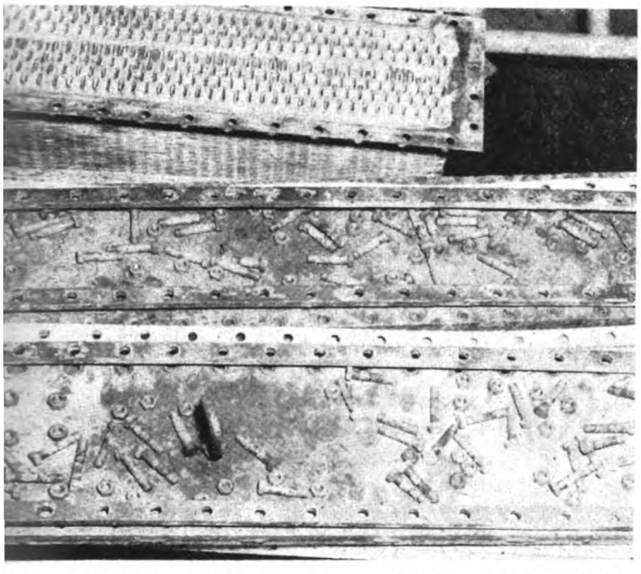
Centralized facilities in the diesel shop at Springfield, Mo., handle all types of radiators and heat exchangers on a production basis. Performance of re-paired units is assured with complete testing.



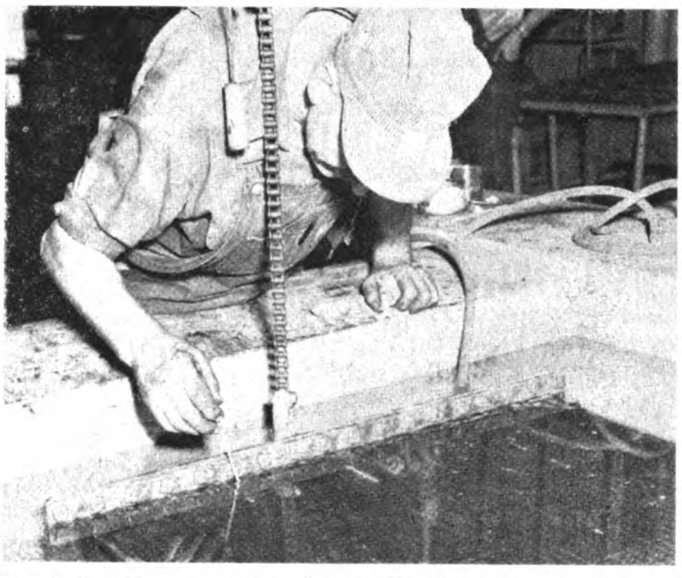
ooler has its cores removed, cleaned and replaced. These passages ntly are trouble source.



Radiator is cleaned by inserting cleaning rod in core slots to remove stubborn deposits accumulated there.



l blanking plates are bolted to the top and bottom of radiator (either water) for pressure testing.

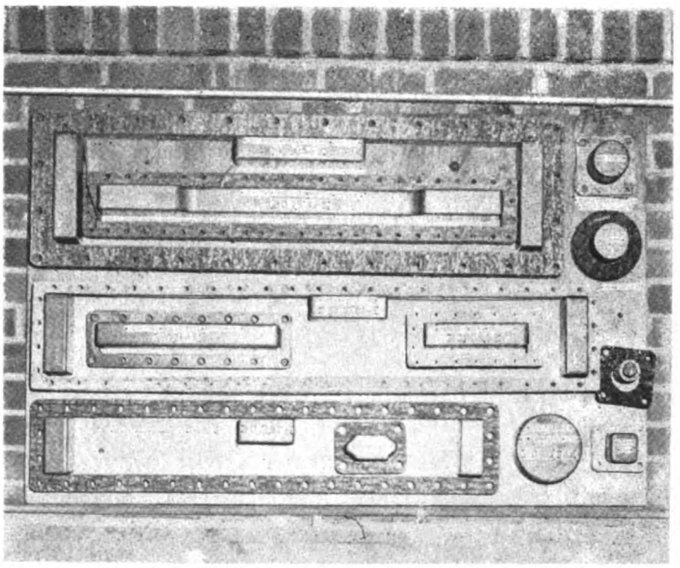


Leak is found by man testing radiator at 15 psi pressure in special water vat. Oil coolers are tested at 20 psi.

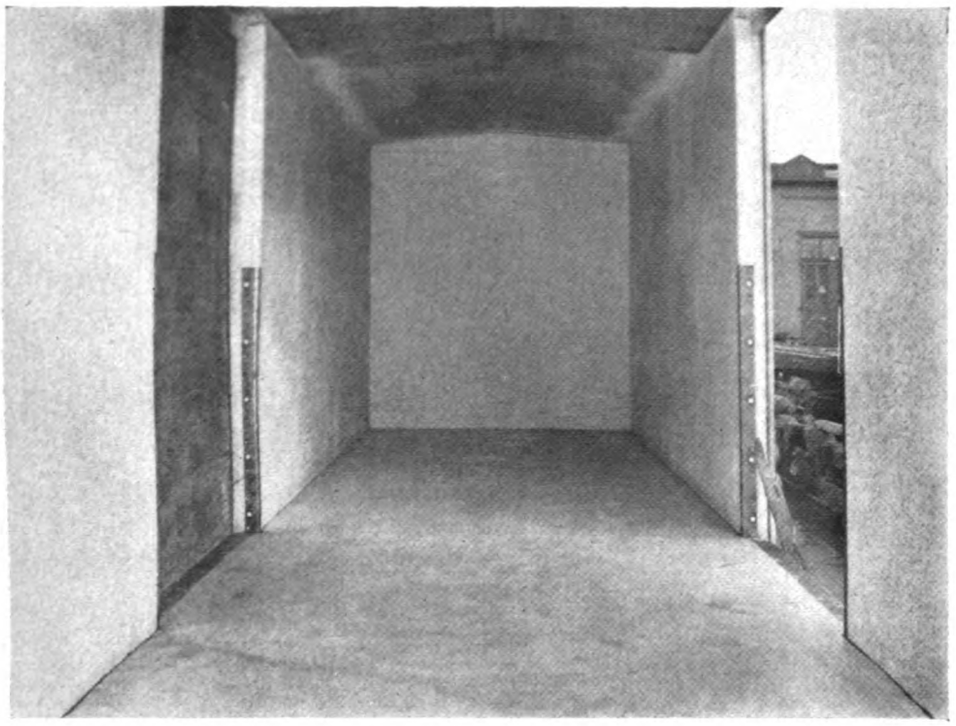
adiators

liators, intercoolers and heat exchangers on diesel locoives require considerable maintenance. They must be kept n internally and externally so that the fluids which flow ugh and around them can do an adequate heat transfer The tubes and fins are easily damaged and are subject to ations which also cause failures. It is essential that a e component like a radiator section be tested and in good dition before it is installed in a locomotive because its oval and replacement is complicated and costly. Any ure in a heat exchanger can be complicated.

he Frisco has through the years since its dieselization tinuously improved its maintenance methods. The shop Springfield, Mo. (*Railway Locomotives and Cars, April 5, page 84*), has been equipped to handle the road's ent 413 diesel units. Here we see the procedures used at Springfield shop in the rebuilding and testing of radi-s. The cover view shows the soldering of a leak found in of the cores during the water test.

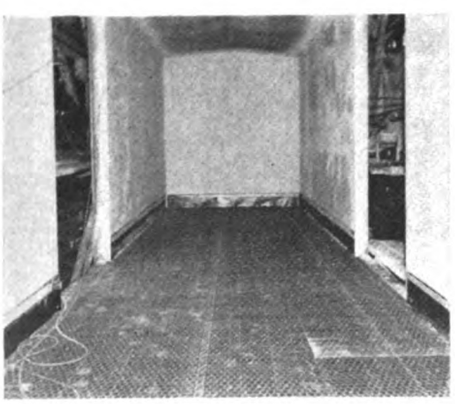


Special rack for all gaskets is located adjacent to final station. Here new gaskets are installed and radiator goes to shop for installation in one of Frisco's diesel units.

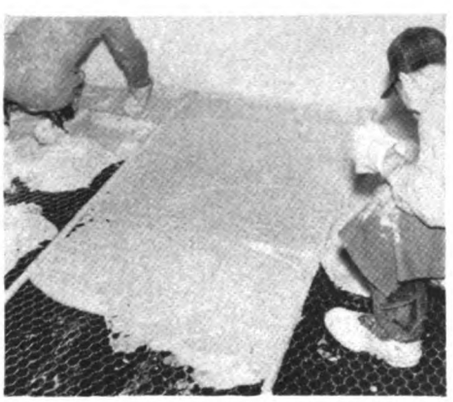


Great Northern box car with Plastinail floor is ready to go back into service. Subsequent repairs to such a floor are not complicated. Cars are relined at the time that floor is rebuilt.

Great Northern Applies Cement Flooring



Car floor covered with felt paper and wire mesh is ready for oxychloride cement.



Wet Plastinail is then worked into the bonding structure formed by wire mesh.

Cement is struck off to proper thickness by using ⅞-in. OD pipe as a guide.

Troweling of poured floor is final operation. After drying, car is complete.

THE GREAT NORTHERN has been applying Plastinail flooring to five cars a week at its Hillyard, Wash., yards. The complete procedure for each car takes about 18½ hr from start to finish, with several cars going through various stages simultaneously. The GN first successfully tested Plastinail in November 1949 and has been using it in 50-car blocks since 1955. As a result of this experience, the road has established an efficient method for applying this flooring.

All material is supplied by the manufacturer, F. E. Schundler, of Joliet, Ill. Normally shipped in carload lots, the material required for a standard 40-ft car costs $178 for a 1-in. thickness of Plastinail on the floor. This includes 1,300-lb of Plastinail, 800-lb of magnesium chloride, 15-lb of nails, 400 sq ft of wire mesh (17 gage, 1½-in. diamond) and saturated felt paper (15 lb), and 3 gal of sealer. While the GN uses a 1-in. thickness, a ¾-in. thickness is sometimes possible, depending on the supporting floor and car structure, at a cost of about $138 a car.

The first step is making minor repairs to the old wood floor. Loose or broken boards are tightened or replaced, if necessary. Then the 15-lb saturated felt paper is laid and lapped over the wood to allow the Plastinail

:ck to deflect independently. The wire :esh is then nailed on 6-in. centers. his wire acts both as reinforcement for :e composition flooring and as a me-:anical key between wood and the :oring material. The surface is then :ady for application of the new flooring.

reparing the Mix

The material can be mixed either by and or in a standard power-driven mor-:r mixer, as used by the GN. A 6½ :u ft electric mixer will produce the mix :quired for a standard 40-ft car in bout 30 min. Each batch is mixed for bout 5 min. A wheelbarrow is used to ansport mix to the car for spreading.

The only critical operation is putting :e correct amount of magnesium chlo-ide in the water that is used for wetting :e Plastinail. Two 100-lb bags of the hloride are mixed by combining them vith sufficient water so that the mixture ills a 55-gal drum to a point 7 in. from ts top. This solution is then used to wet he material so that the mixed cement :as a 7-in. slump. It is then ready for :ouring.

A ⅞-in O. D. pipe is placed on the loor to determine the thickness of the :oured material; it is removed before larbying. The Plastinail is poured in rom both ends toward the middle of the :ar. After pouring, it is worked into the vire mesh to assure a good bond. Fol-owing this, it is stuck off level with a ⅞-in. pipe, which with the ⅛-in. thick-:ess of the wire mesh gives a 1-in. thick ayer. After the entire car floor has been :overed and struck-off, the pipe is re-noved and the floor darbied to remove he marks left by the pipe and the traight-edge.

After darbying, the flooring is al-owed to harden for final steel troweling. During this period another car floor is :apered and wired in preparation for :ouring of the flooring.

Hardening of the floor is determined :y the temperature of the water used and :f the surrounding air. The hardening reaction is oxothermic and once started will acquire final hardness without need for external heat. Extremely cold weath-:r only delays initiation of the reaction and will not interfere with it once it starts. Virtually impossible to freeze, the mixture will not suffer from cold but will merely stay plastic longer in the 0 to 20 deg range, so that more hours are required to effect a set.

When the chemical hardening is complete, 3 gal of the sealer is applied to the surface. The floor is water resistant, non-abrasive, and fireproof. Any minor damages to the monolithic surface can be quickly patched using a small quantity of the material as a patching plaster.

Ceramics Work in C&EI Diesels

C&EI tests show ceramic coated piston head is effective in maintaining clean lube oil.

CLEAN CYLINDER WALLS, combustion chamber, exhaust ports and rings are the result of application of two opposite test pistons with ceramic coated crowns to an EMD 567-C engine on the Chicago & Eastern Illinois. Since December 12, 1957, when the pistons were installed, the engine has operated about 70,000 miles.

The coating is a mixture of rare earth oxides containing ceria and the application is simple. The piston crown is shot-blasted with G-25 steel grit and the material is applied from 0.004-in to 0.006-in. thick with an oxy-hydrogen flame. Magnetic thickness gauge measurements show no variation in thickness. The coating provides insulation, a high surface temperature, and has the abiiity to re-radiate heat.

The process came to the attention of the railroad through the Armour Research Foundation. Last fall, Armour added a new type of ceramic catalytic coating to its flame ceramic process. Many industrial applications use this, or similar coatings. They provide excellent wear surfaces, abrasion resistance, high-temperature electrical insulation, and resistance to molten metal. High temperature applications have been made in rockets and missiles. Laboratory tests on a Chevrolet engine with the piston crowns coated showed unburned hydrocarbons reduced as much as 40 per cent. Other tests on a Fairbanks-Morse engine showed the coated piston operating at temperatures 180-deg lower than those of the uncoated pistons.

Of equal importance was the condition of the lube oil. On April 22, a 1500-hp locomotive was placed in passenger service with its engine equipped with sixteen coated pistons. At the 20,-000 mile check on July 3, the lube oil was compared with that in another engine in service the same length of time. The oil in the test engine was very clean. There was no change in color from oxidation products, which indicated more complete combustion. Filter mileage has been extended from 1 month to 2 months. An iron analysis was run which showed 25 parts per million for the engine with the uncoated heads and only 15 parts per million for the coated heads.

A standby engine has been equipped with sixteen coated heads and will be installed in the near future and subjected to a load test. The C&EI expects some interesting data. On the basis of present tests, it is believed a 30 cetane fuel will give the same results as a 50 cetane fuel. With more complete combustion of fuel, it might be possible to attain maximum horsepower at reduced power piston setting with a resultant savings in fuel.

RDC Pistons Coated

The C&EI has coated some piston heads for its spare Detroit GM diesel for its RDC. These small high-speed engines create considerable unburned carbon when using heavy, low-cetane furnace oil. The coating is intended to alleviate the dirty lubricating oil condition this creates, and should extend filter and oil change periods while lengthening the life of the engine itself. An exclusive license for world wide rights for the process has been obtained by the Continental Coatings Corporation of Chicago from the Armour Research Foundation.

Other test applications of different types of coatings in the railroad field include EMD liners coated with rutile (titanium oxide). The material is applied so that the finished size is 0.005-in. thick on each side, a total of 0.010-in. on diameter. It is said to give an extremely hard coating with a high surface porosity. Another test will be conducted with the piston crown and head coated with the rare earth oxides, to determine any reduction in thermal cracking. At present, no information is available as to the probable life of the ceramic coating.

Improving Diesel Fuel Filtration

FILTRATION must maintain cleanliness and, at the same time, cause a minimum pressure drop in fuel systems. Pressure drop beyond tolerable limits can be as serious as contamination because the reduced flow starves the fuel injection pump, and may cause pump damage and loss of power.

In any study of filtrants the two factors, *cleanliness* and *pressure drop,* must be considered simultaneously and in their relationship to each other. In this laboratory test, a filtrant is disqualified that captures and hold contaminants but reduces flow by excessive differential pressure build-up before a target life cycle of 60 hr. Conversely, a filtrant that maintains a high flow rate yet permits contamination beyond set limits, as measured by precipitation number, is also considered deficient.

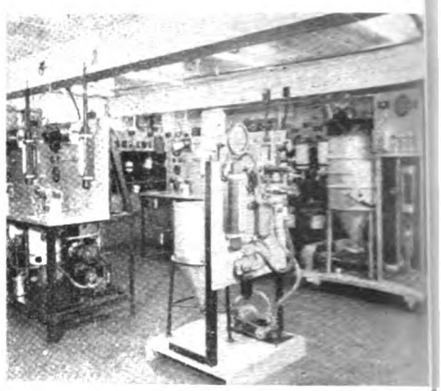
A locomotive manufacturer for many years has supplied the second-stage filter cartridge designated as "A" in this study as original equipment. In most cases, this cartridge is considered the standard with which all replacements are compared. White cotton thread waste cartridges (CI-1129C) have been the most popular replacements for the original equipment cartridge.

The difference in performance between conventional filter cartridges is well illustrated in comparing cartridge "A" and the waste-packed cartridge. The test life of cartridge "A" is 50 hr as compared to 5 hr for the waste cartridge. The popularity of the waste-packed cartridge in terms of filtration efficiency is apparent. The waste unit operates throughout its flow life at high efficiency, maintaining contamination levels at trace amounts. Cartridge "A," on the other hand, permits a very sharp rise in precipitation number to .034 and after 16 hr contaminant levels are finally reduced by cartride "A" but never reach the "trace amounts" effectiveness constantly maintained by the waste cartridge.

The objective in developing new second-stage filtrants for locomotive fuel service is threefold: (1) extend service life beyond that of the standard "A" cartridge; (2) match the high filtration efficiency of cotton waste, and (3) achieve these results while maintaining a high rate of flow.

This study was made to determine the relative merits of three filtering materials as jointly compared with the standard "A" filter and cotton waste. These are designated as "R", a rayon filter identical in construction to type "A"; "P-1", a newly developed pleated filtrant, and "P-2", a conventional pleated filtrant.

All filters operated under precisely controlled conditions using 7.5 gal of clean No. 2 fuel oil with a constant flow of 1 gpm. Every hour of the test 5 grams of AC fine dust (recognized fuel test contaminant) were added to the system. Hourly readings of differential pressure and contamination (ASTM precipitation number) were recorded.



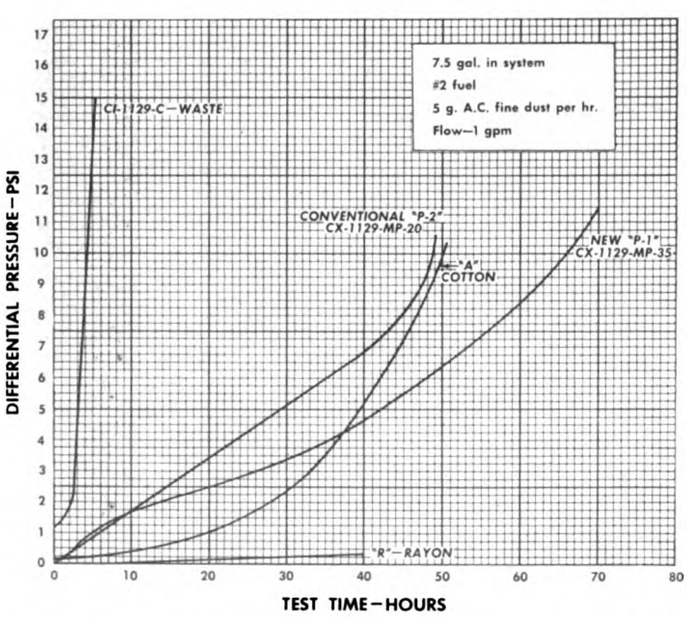
Laboratory equipment includes oil reservoir, pump and filter equipment mounted on test stand.

The performance of the "R" (Rayon) filter was so erratic that continuance of tests beyond 40 hr was considered to no purpose. The steep rise in contamination in the first 30 hr indicated the material's filtering ability is highly questionable although differential pressure is low.

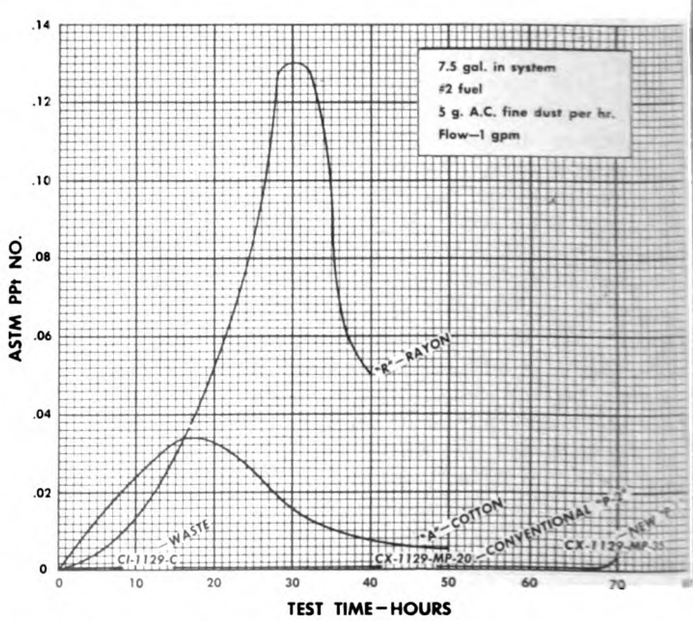
Both pleated filters show the same ability to remove contaminants. Contaminant level does not rise until after 70 hr. The differential pressures do vary. P-2 (the standard paper) exhibited a uniform pressure rise to 45 hrs and then rose sharply.

P-1 (the new pleated filtrant) developed a much less steep curve and did not attain the critical 10 psi point until 65 hr of test. Field tests are now being conducted on the new P-1 filtrant. Reports received to date confirm the results obtained in the laboratory as to the removal of contaminants, improved flow rate and extended life.

This article by James Wilson and Ralph Young, Engineering Dept., Wix Corp., Gastonia, N.C., is based on a study of second-stage fuel oil filtration made in the Wix laboratories.



Pressure drops across series of different filter media were one step in determining ultimate life.



Cleaning efficiency was measured by checking dirt which filters removed from circulating oil.

B Brake Equipment *Installment 2*

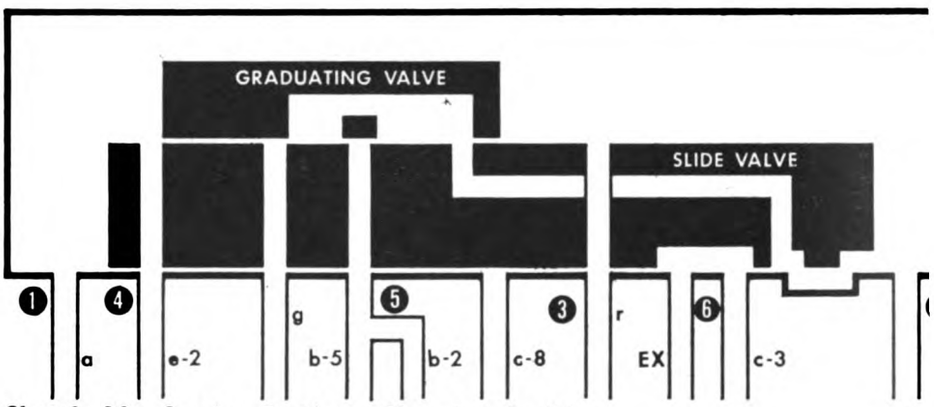
Slide and Graduating Valve Connections

This is the fifth installment in the series on the AB brake. The color chart for this series was published with the first installment in the November 1956 issue, p 87. The purpose of this fifth part is to present a series of diagrams explaining the slide valve function in both portions of the brake valve. All of these positions will then be available in ready reference form.

Service Portion Charging Position

In coloring Sketch 20, begin with the dark green pencil. Color sequences 1, and 3 but do not carry this color into the passage leading through the slide valve to the emergency reservoir. Stop the green color at the point where this passage begins (at the slide valve upper face). Dampen and let dry.

With an orange pencil, color the passage to the emergency reservoir described in sequence 4. Begin where the green color ended at the top of the slide valve. Dampen and let dry. With a yellow pencil color sequence 5. With a pink pencil in dashes, color sequence 6.



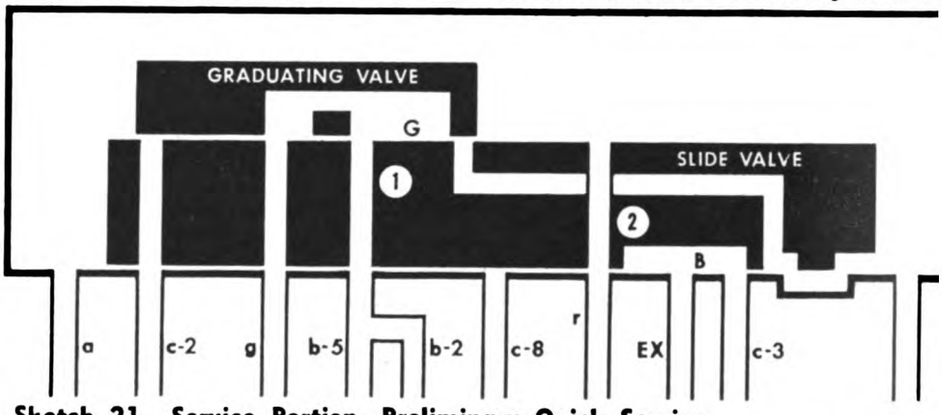
Sketch 20—Service Portion—Charging Position

Connections are as follows:
1. Auxiliary Reservoir *(a)* to space above Slide and Graduating Valves.
2. Auxiliary Reservoir *(a)* to Release Insuring Valve—Pressure Face.
3. Auxiliary Reservoir *(a)* to Release Insuring Valve—Exhaust Face *(r)*.
4. Auxiliary Reservoir *(a)* to Emergency Reservo *(e-2)*.
5. Brake Pipe *(b-5)* to face of Graduating Val and to Release Insuring Valve Diaphragm *(b-2*
6. Brake Cylinder *(c-3)* to Retaining Valve *(Ex*

Service Portion Preliminary Quick Service

To color Sketch 21, again begin with a dark green pencil. Fill in the space around the slide and graduating valve and the connecting passages. Dampen with the small brush and let dry. With yellow pencil, fill in cavity G in graduating valve and the connecting passages to the release insuring valve, brake pipe, and quick service volume. Dampen and let dry.

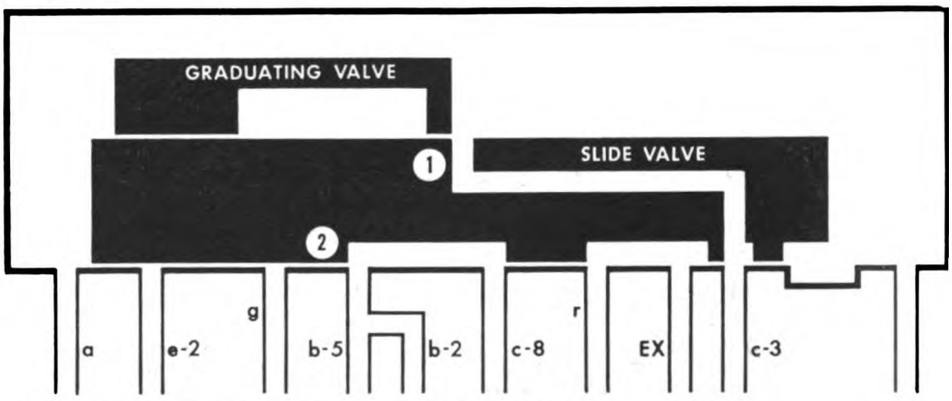
With an orange pencil, fill in the passage to the emergency reservoir which is blanked by the graduating valve. Dampen and let dry. With a pink pencil in dashes, fill in cavity B in the slide valve and the two connecting passages—one to the retaining valve and the other to the brake cylinder. Dampen and let dry.



Sketch 21—Service Portion—Preliminary Quick Service
1. Brake Pipe air *(from b-5)* flows to cavity *G* in Graduating Valve and to Quick Service Volume *(g)*.
2. Auxiliary Reservoir air passes through Slide Val to Release Insuring Valve *(r)*.

Service Portion Service Position

To color Sketch 22, proceed as follows: With the dark green pencil fill in the

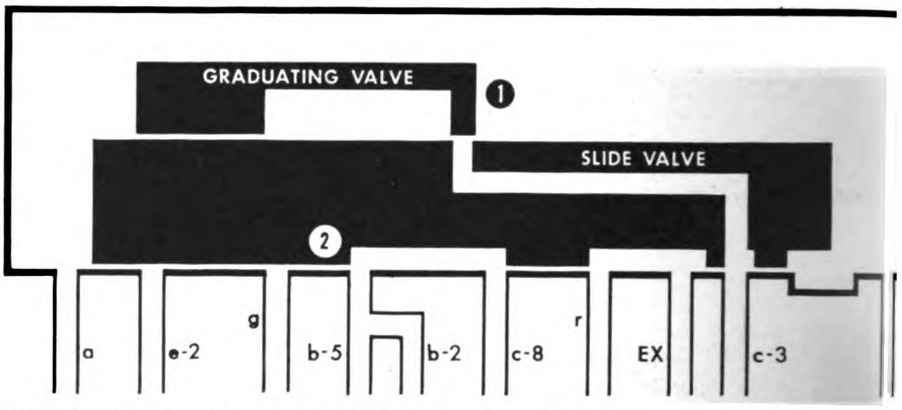


Sketch 22—Service Portion—Service Position
1. Auxiliary Reservoir air *(from a)* flows past Graduating Valve to Brake Cylinder *(C-3)* passage.
2. Brake Pipe air *(from b-5)* goes through Sli Valve cavity to Quick Service Limiting Val *(c-8)*.

space around the slide and graduating valves and the passages at each end of the sketch. Stop the green color where the brake cylinder passage begins at the top of the slide valve. Dampen and let dry.

With a yellow pencil, fill in the cavity in the slide valve which connects the passage from the brake pipe to the quick service limiting valve.

Starting at the top of slide valve with a pink pencil, fill in the passage to the brake cylinder. With an orange pencil, fill in the passage to the emergency reservoir which is blanked by the slide valve.



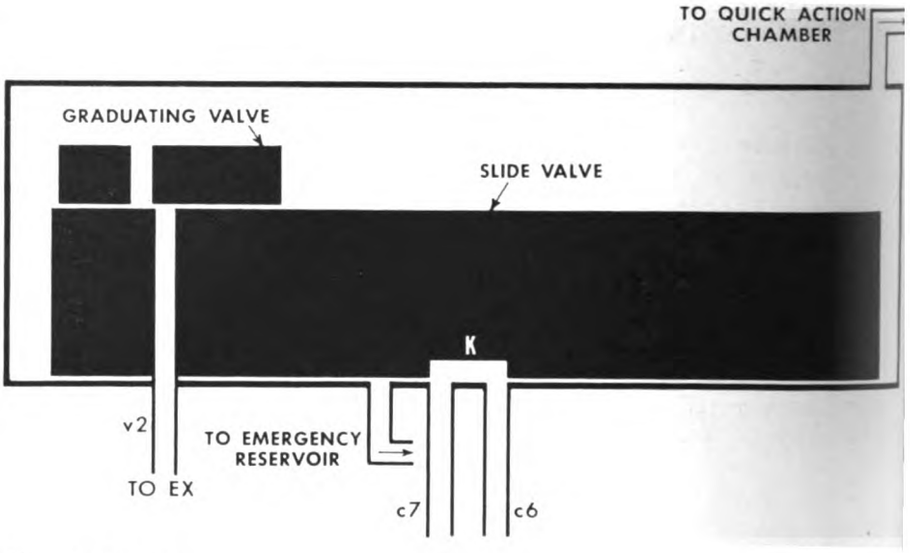
Sketch 23—Service Portion—Service Lap Position

Connections are as follows:
1. Flow from Auxiliary Reservoir *(a)* to Brake Cylinder *(c-3)* is blanked by Graduating Valve.
2. Brake Pipe *(b-5)* is connected to Quick Service Limiting Valve *(c-8)* by Slide Valve cavity.

Service Portion
Service Lap Position

To color Sketch 23, proceed with the dark green pencil. Fill in the space around the slide and graduating valves and the two passages at the ends of the sketch. Dampen and let dry. With a yellow pencil, fill in the brake pipe passage, the cavity in the slide valve and the passage to the quick service limiting valve.

With a pink pencil, fill in the passage to the brake cylinder which is now blanked at the graduating valve. With an orange pencil, fill in the passage to emergency reservoir which is blanked at the slide valve. Dampen and let dry.



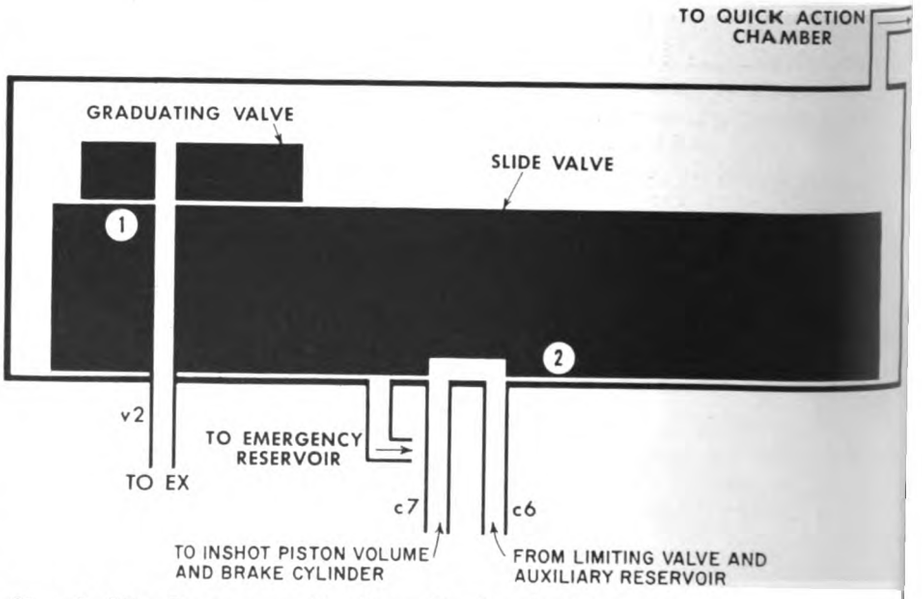
Sketch 24—Emergency Portion—Release and Charging Position

No flow of air at this time.

Emergency Portion
Release and Charging Position

With a heliotrope pencil begin Sketch 24 by filling in the space around the slide and graduating valves and the passage to the quick action chamber. Color in heliotrope dashes passage **v2** to **EX** which is blanked at the slide valve. Dampen and let dry.

With a pink pencil, in dashes, fill in cavity *K* in the slide valve and the two connecting passages. Dampen and let dry. With an orange pencil, fill in the passage to the emergency reservoir which is blanked at the slide valve.



Sketch 25—Emergency Portion—Service Position

1. Quick Action Chamber to exhaust *(EX)*.
2. Brake Pipe and Auxiliary Reservoir to inshot piston volume brake cylinder in First Stage Service, and from Auxiliary Reservoir only in Second Stage Service.

Emergency Portion
Service Position

To color Sketch 25, proceed with the heliotrope pencil, filling in the space around the slide and graduating valves and the passage to the quick action chamber. Fill in passage **v2** to **EX.** Dampen and let dry. With a pink pencil, fill in cavity *K* in the slide valve and the two connecting passages. With an orange pencil, fill in the passage to the emergency reservoir.

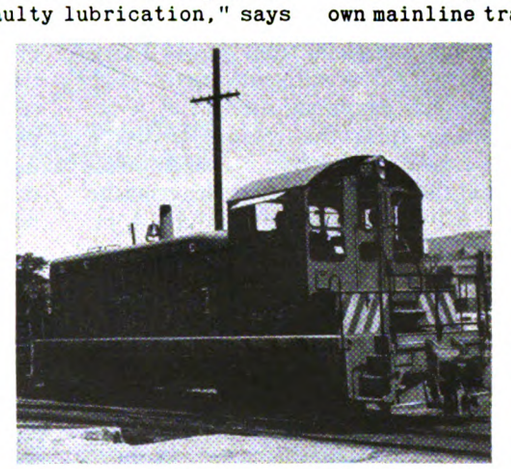
ENGINEER'S FIELD REPORT

PRODUCT **RPM DELO OIL RR**

FIRM **BAMBERGER RAILROAD CO**
Salt Lake City, Utah

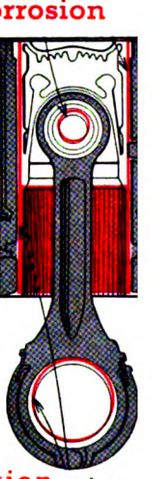
5 years without overhaul on RPM DELO Oi

Lubricated with RPM DELO Oil RR since going into service, three switch locomotives of Bamberger Railroad have worked over five years without a major overhaul. "The oil does such a good job of protecting engines that I've never had to repair or replace a part because of faulty lubrication," says General Shop Foreman J. F. Buckley (below). "Every time we've opened the engines for inspection we've found them clean, free of carbon or lacquer deposits." Bamberger hauls general freight between lines of UP, WP, SP, and D&RGW over 36.9 miles of its own mainline track between Salt Lake City and Ogden



Clean piston (above) has no measurable wear, shows the kind of performance Bamberger gets with RPM DELO Oil RR. "We simply wipe off parts and they're bright and shining," says Mr. Buckley. Firm's EMD 800's (#601 top right, #602 above) deliver cars to sidings and make up trains for larger locomotive—work an average of 16 hours a day. Engine #570 (top left) makes the Salt Lake–Ogden run, works 10 to 12 hours daily.

Why RPM DELO OIL RR reduces wear, corrosion



- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists foaming

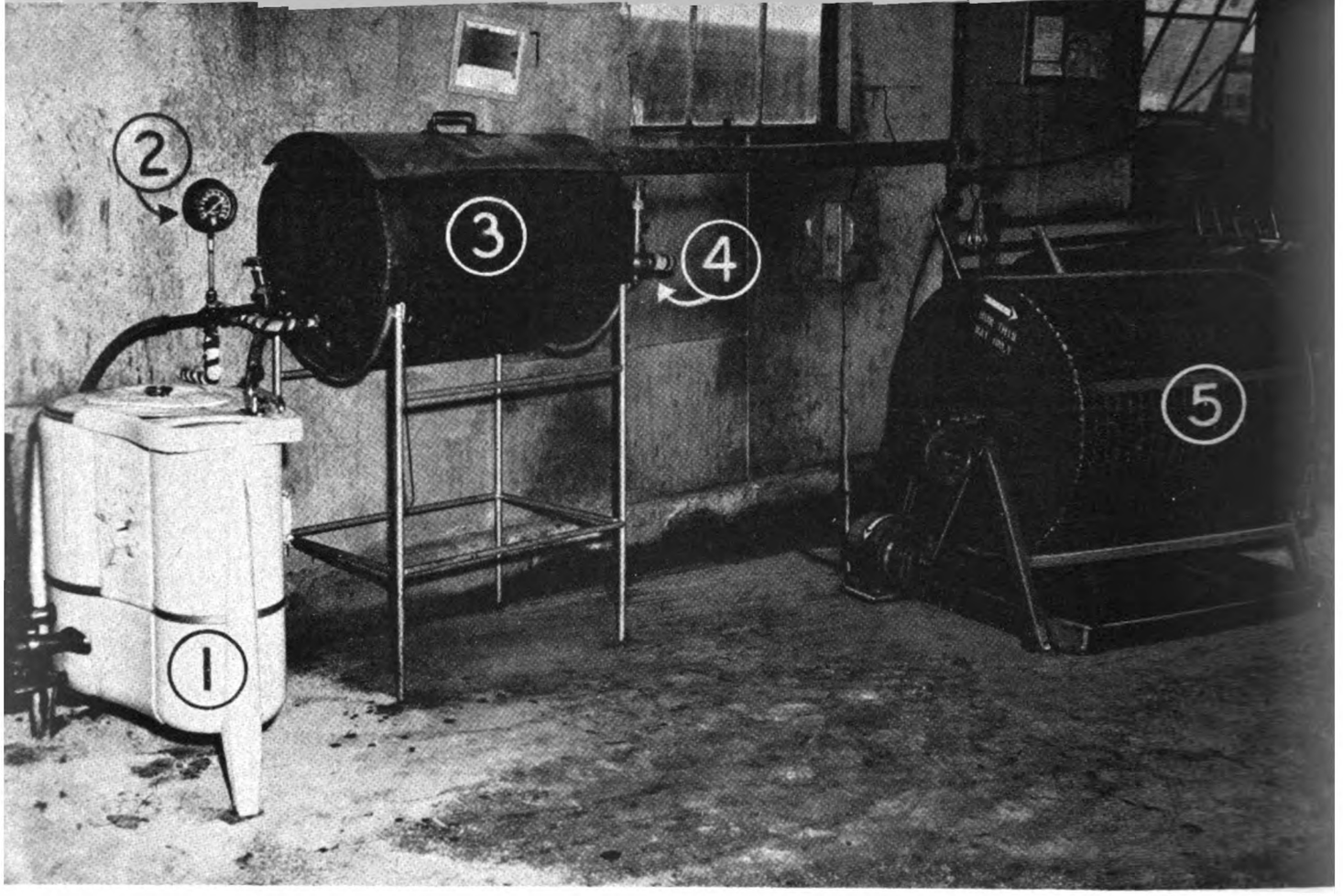
For More Information abou RPM DELO Oils or other petroleu products of any kind, or the nam and address of your nearest dis tributor, write or call any of th companies listed below.

LUBRICATING OILS RPM DELO

TRADEMARKS "RPM DELO" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Pas
THE CALIFORNIA COMPANY, Denver 1, Colorad



Lubricator laundry includes (1) washing machine, (2) oil temperature gauge, (3) oil supply, (4) thermostatic valve, and (5) tumbler.

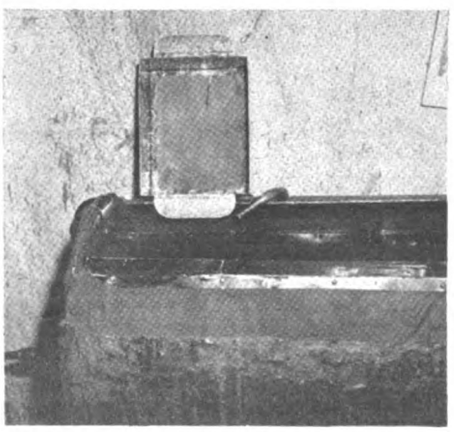
Northern Pacific's Approved Lube Pad Cleaner

THE NORTHERN PACIFIC took the housewife's Easy Spindry washer, added oil supply, a heater and a tumbler, and came up with a simple, inexpensive lubricator pad renovator. The cleaning procedures meet all requirements of AA Spec. M-910A-57.

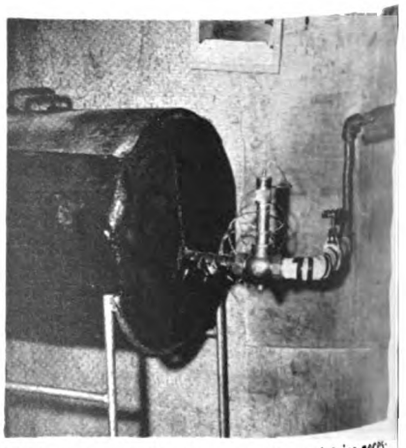
The oil storage tank is made from a a 55-gal steel drum, insulated with sheet asbestos, and supported in a horizontal position next to the washing machine. The drum is equipped with a strainer screen placed under the return pump outlet to catch whatever lint and other material is forced through the special filter screens. Steam to the pipe coils in bottom of drum is controlled by a Crane Company thermostatic valve, which keeps the car oil at 240 deg. F. An additional double screen filter is installed at the washing machine through which the oil is pumped to the washing side. Rubber gaskets in the washer are replaced with neoprene.

The shop-made 36-in diameter wire-mesh tumbler is equipped with a ½-hp motor. It operates at about 15 rpm, using hoisting gears from an old Evans auto loader for reduction gears. The tumbler has a plywood shelf 18 in. wide, extending from the rotating shaft to the outside periphery. An additional partial shelf extends out on the opposite side, leaving a space of about 14 in. between it and the shaft. The pads are placed side by side in the tumbler, an the rotating action plus the partial she turns them over until they reach th half shelf, then they drop to floor of th tumbler. This action removes much o the loose dirt, grit and lint from th lubricator.

(*Continued on page 36*

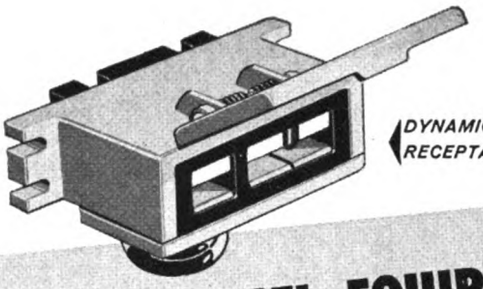


Filter on tank (in raised position) is placed under pump outlet to remove foreign materials.



Thermostat on oil tank steam line maintains necessary temperature of 240 deg F in coils.

LOOK FOR THIS
MARK OF QUALITY!



DYNAMIC BRAKE RECEPTACLES

JOY CONNECTORS for DIESEL EQUIPMENT!

Your confidence in JOY electrical connectors will never be betrayed! Carefully designed and manufactured to the highly specialized requirements of R.R. circuits, JOY plugs, jumpers and receptacles have been "working on the railroad" since '36. Factory molded as trim, rubber insulated/Neoprene jacketed units that are absolutely safe to handle even in dripping wet installations . . . they're shatter-proof, distortion-resistant and practically immune to damage by oils, grease, ozone and acids.

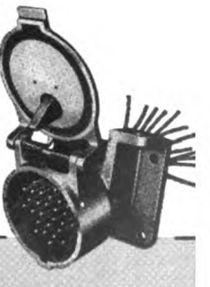
Complete details on JOY connectors for Diesel equipment as well as many other railway needs may be found in Bulletin # B64. If you haven't received your copy, or need extra copies . . . please fill out and mail the coupon below to:

JOY MANUFACTURING COMPANY
ELECTRICAL PRODUCTS DIVISION
1201 MACKLIND AVE., ST. LOUIS 10, MISSOURI

DIESEL DYNAMIC BRAKE JUMPERS

CONTROL JUMPERS

CONTROL RECEPTACLES



Note flexibility, illustrated by knot tied in cable.

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STAND-BY SERVICE	4-7
CAR EQUIPMENT	8-15
DIESEL EQUIPMENT (Including Traction Motor Sleeves)	**16-21**
ROTARY SAND DRYERS	22-23
PORTABLE LIGHTING (SAL)	24-28
SPECIAL APPLICATIONS	29-36

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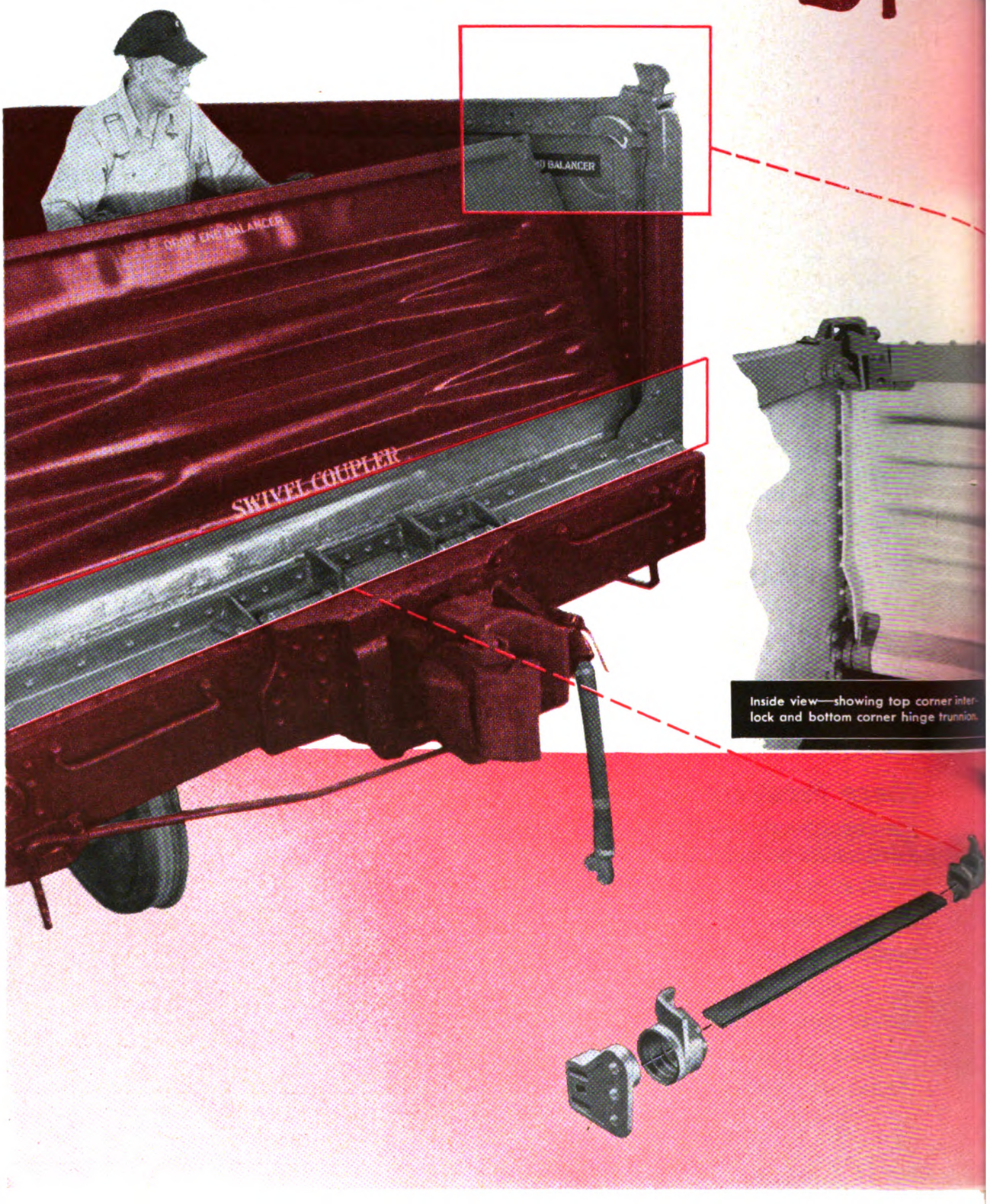
CD 158.1

Cast Steel
INCORPORATED DROP END UNITS

Spee

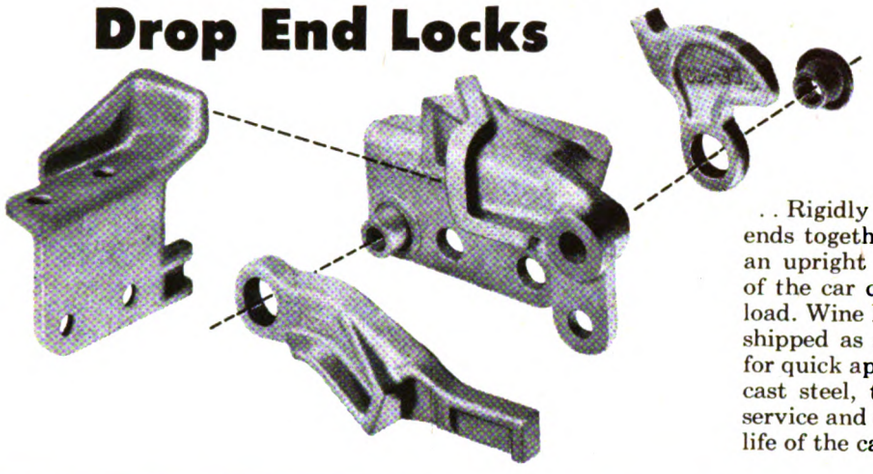


Inside view—showing top corner interlock and bottom corner hinge trunnion.

ervice.. Sustain Structure

For outstanding economies . . . increased safety factors . . . improved strength and durability for the life of the car—Wine Drop End Units (Locks and Balancers) form *the perfect* combination!

WINE
Drop End Locks



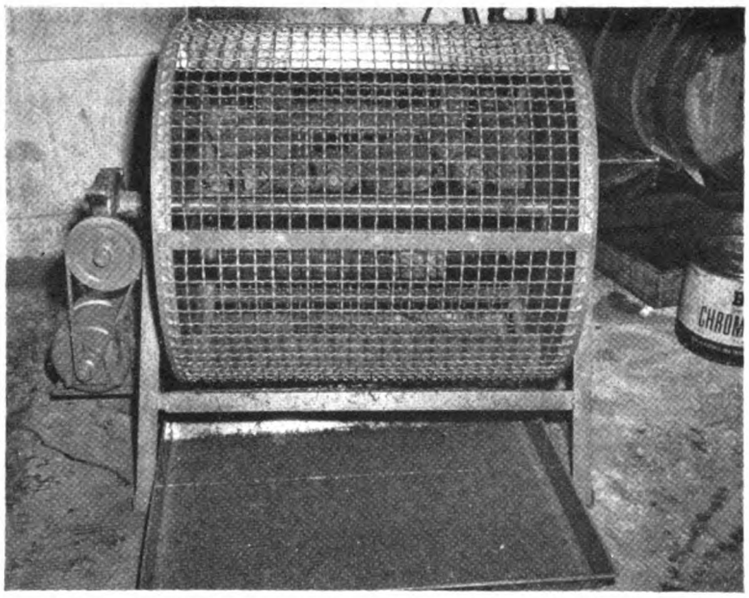
. . Rigidly interlock gondola sides and ends together—securing the ends in an upright position. Top corners of the car cannot spread regardless of load. Wine Drop End Locks are shipped as an assembled unit, ready for quick application. Made of electric cast steel, they insure maximum service and durability throughout the life of the car.

WINE
End Balancers

. . Eliminate the necessity of using *our or five men* to close a drop end for car loading! Multiple spring steel torsion bars, incorporated between the center casting and the two outer hinge trunnion castings, permit *one man* to readily close the heaviest drop ends without assistance. Available for easy application on most drop end gondolas.

WINE

THE WINE RAILWAY
APPLIANCE COMPANY
TOLEDO 9, OHIO



Tumbler loaded with pads is ready for operation. Shelves extend toward center of circular cage to produce tumbling action.

Gaskets in this household washing machine were replaced with ne to withstand hot oil.

NP Pad Cleaner

(*Continued from page 32*)

A set of dirty lubricator pads are first placed in the tumbler for about 10 to 15 min. Two to four pads, depending on the size, then go in the agitator tub for 15 min. Hot car oil runs into the tub during the entire washing process. The rate of flow is adjusted to the capacity of the pump which keeps pumping the cooler oil back into the heating tank. In this manner, the temperature and level of the oil in the tub is maintained fairly constant.

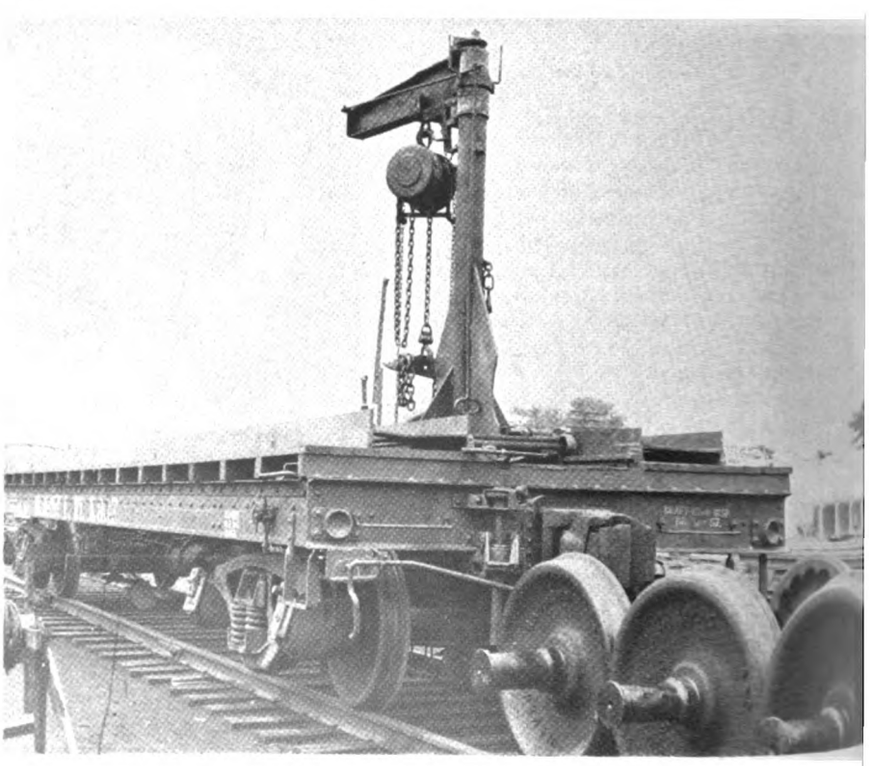
After washing, two pads are placed in the spin-dryer portion of the tub for 2 to 3 min. The pads are removed, gaged, inspected and necessary repairs made. In the final operation, the pads are saturated with clean car oil. Approximately 40 gal of car oil in the system can be used to clean a large number of pads before it must be reclaimed or discarded. All types of pads can be reclaimed except those having metal parts.

Satisfied with the results obtained using the present device, the NP approached the American Laundry Machinery Company and suggested that its engineers develop a heavier duty machine that could be operated seven days per week, three shifts if neces American Laundry adapted a re dry cleaning machine equipped wi washer and spinner. A method of ing the oil was added and changes made in the pump and valves to ha heavier material. The machine ha capacity of 55 gal of oil, which either be heated by steam or electri with a 10-kw heater. It will take u four pads at a time, with 10 min in washer and 2 min in the spinner. cleaning capacity is 600 lb per hour locations where three or four cars serviced daily, the NP's present mach can be duplicated for about $350.

Wheel Flat Has Traveling Jib Crane

The Minneapolis & St. Louis took a 40-ft flat, spent $800 and converted it for transporting wheel sets (good and defective) between the shop and on-line points. The jib-crane, made entirely of scrap materials, can be moved the full length of car. It operates over the car end to place wheel sets on the rail or lift them off. The car is used at Albert Lea, Minn., and Mason City, Ft. Dodge, and Des Moines, Iowa, where there are no stationary cranes. Installing these would cost about $1,000 for each location.

M&StL's old method of wheel handling has become a two-man operation —one man on the car and one on the ground. There is a saving of four man-hours on every loading or unloading operation. The car was converted at Marshalltown, Iowa.



These switchers were death on brushes

...'til the road tried NATIONAL TRADE-MARK

M. HENIKA

The road switching locomotives of this railroad were breaking hundreds of brushes per month, says "National" Carbon Brush Man Morgan Henika.

Source of the trouble was severe vibration caused by widely varying operating conditions. Morgan recommended "National" brushes grade DE-3 for their special shock-resistant qualities.

RESULT: in the next twelve months, not one report of brush breakage.

Trouble-shooting is a specialty of "National" Carbon Brush Men serving the nation's railroads. The men's training, backed by National Carbon's *long term brush development,* make them your best consultants.

Call your "National" Carbon Brush Man or write to National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

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RICAL SECTION

AAR
n

H. P. Wright, B&O
New Chairman

J. J. Schmidt, D&RGW
New Vice Chairman

C. R. Bland, C&O
1957-1958 Chairman

AAR Electrical Section Meeting . . .

Pacing Electrical Progress

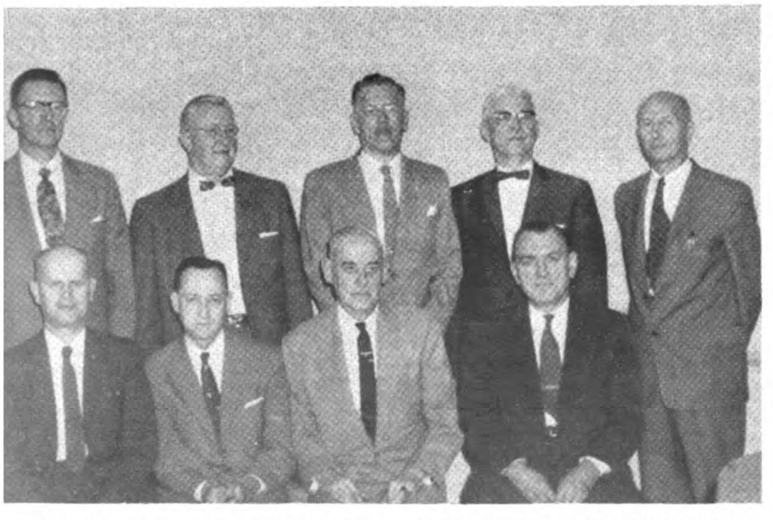
of new electrical olling stock and fixed oads was reported by committees presenting ent ninth annual meet- al Section, Mechanical Divisions, AAR.

L. Bland, C&O, opened ointing to the growing lroad electrical depart- members to urge more nen to take an active part in Committee work. He said all departments are dependent upon electrical equipment and added that it was the personal obligation of electrical men to keep this fact before the eyes of management.

W. M. Keller, vice president — research, AAR, also spoke of this importance and referred to the motto "There is no progress without electric energy" which appeared over the speakers' table. He paraphrased it by adding, "There is no electric energy with electrical engineers." He then prais the group for its effective work and s that the AAR Research Center expect to give greater recognition to thi electrical.

Just before adjournment, R. F Dougherty, UP, proposed that the futu work of committees should deal m with economics. He also suggested t the work of some committees should consolidated. This would eliminate so formalities of procedure and allow m time on the floor when the Section is session.

The Committee on Resolutions cit members of the Electrical Section s for the great service they have render to the Section during the past year. also cited A. G. Oehler, the electri editor of *Railway Locomotives a Cars,* for his "unusual, competent a extremely agile reporting." This is re dered with a smile because the citat is given before the report is finishe



n of the Section is composed of (bottom row, left to right) J. J. Schmidt, D&RGW; C. R. Bland, C&O; S. B. Pennell,NYC; J. L. Christen, Pullman Co.; (top row, left to R. H. Russell, GN; C. C. Elber, Secretary—Electrical Section; S. V. Smith, PRR; P. B. Burckett, B&M.

Election of Officers

Officers elected to serve during coming year are Chairman: H. Wright, electrical engineer, B&O; Vi Chairman: J. J. Schmidt, electrical search engineer, D&RGW. Memb elected to the Committee of Direct were: H. L. Betts, chief electrical e gineer, CNR, and R. A. Harring engineer train lighting, CMST P&P

ıore A-C Equipment
ı Rolling Stock

The report on Car Electrical Equipment ;cribes a variety of tests for Spicer clutches. ;t of the test equipment ranges from ,000 to $10,000. It is suggested that if an :rtia method of determining clutch is con- ered satisfactory, that costs may be con- erably reduced and tests might be made der the car.

A new caboose power supply system, de- loped by Safety Industries, consists of a 5-kw, 14-volt, 108-amp inductor alternator, :ectifier panel and a voltage regulator panel. ıe report indicates it will operate with any ive which provides suitable operating speeds. ıe generator develops full load at 1,400 m and will operate at speeds up to 7,000 m. Rectifier temperature is used to limit nerator output current.

A method for capacity rating of storage ıtteries in passenger car service has been epared to provide uniform and completely mparable results. It covers ampere-hour ıd kilowatt-hour capacity, voltage limits, ıd specific gravity at specified temperatures. formation covering capacity tests and data ate requirements are also covered as are ıble requirements for inter-tray connectors.

Lead-calcium batteries have been under st by 10 railroads since 1953. Twenty-four ıtteries were tested on diesel-electric loco- otives, commuter cars, head-end and pas- nger cars and in sub-station control service. he most distinguishing characteristic of ıe lead-calcium battery shown by the tests that it requires from one-half to one ghteenth as much water for flushing. Most f the users desire more experience before ıdeavoring to evaluate other characteristics f this type of battery.

In presentng the report, R. H. Russell, GN, ıid that the Pullman Company is develop- ıg a means of blocking clutch weights which ıay permit testing of clutches without the eed for disassembly. R. I. Fort, IC, said ll forms of dynamic testing are expensive nd asked if inertia testing were satisfactory. [. Clark, Davo Manufacturing Corporation, :ported that his company will run inertia :sts to see if it is.

A discussion of battery powered car marker ghts indicated they may prove satisfactory. he light, which is of high brilliance, is a ashing light wth an "on" perod of such ıort duraton that battery drain is small.

Mr. Fort described a new method of sup- lying parked Pullman cars with power. It onsists of two paralleled rotary converters ıounted in a baggage car. A GP9 diesel perating in the third notch supplies the ower, and the rotaries furnish 375 kva of 20-volt, three-phase a-c power to the cars. ıs much as 500 kva of power may be sup- lied with the engine operating in the fifth otch.

ıir Conditioning
ınd Refrigeration

Mechanical refrigerator car temperature ontrols first covered in the 1957 report, ere again studied in 1958. Among the three ew types of control, is an improved Vapor nit in which there are two stages of cooling vith a minimum interval of 1½ deg F.

Another is a Penn control which uses a iquid-filled spiral sensing element connected o the panel by a 96-in. capillary tube. As he car temperature changes, the liquid ex- ands or contracts and the resultant motion

R. H. Russell, GN

E. H. Brown, PRR

is transmitted through a mechanical linkag to operate a set of sensitive contacts whic in turn control the pilot relays.

Another Penn control incorporates a mag netic amplifier to provide a closer contr of temperature than can be obtained wit the capillary tube type of control.

A comprehensive study of passenger ca heating has been made. A well-insulate passenger car will use from 230 to 350 l of steam per car per hour at ambient ten peratures of 0 to 31 deg F. A 2-in. train lin cannot heat more than 12 to 14 cars, and 2½-in. line will heat 16 to 20 cars satis factorily. Steam heat, waste-product hea three types of electric heat and reverse-cycl heating are described in the report with i lustrations.

"This study", the report states "indicate that all methods of electric heat, includin the reverse-cycle heating system, for an in dividual non-electric passenger car requir the use of an additional axle-driven moto generator. Although the maintenance cost c these systems may be less and the usua difficulties encountered with steam trainline are eliminated, electric heating would not b economical as it would require addition tractive force from the diesel-electric or ele tric locomotive, when maximum tractive forc is needed during the winter season. Th would result in the use of additional loco motive power or the reduction in the numbe of cars in the train.

The waste heating system from diesel en gine-alternator power plant is the only sy tem other than steam that does not requir additional tractive force to generate the ele tric power required. Although the trouble encountered with steam heating apparatus an steam trainlines are eliminated, the overa cost of equipment and maintenance woul probably be greater."

A report on the performance of high-spee air conditioning compressors shows that the developed some wear and troubles not con mon to the slow speed type. Some of thes however, have been due to incorrect opera ing and maintenance practices and othe have been corrected by improvements in d sign. The report states that there is a definit need for an educational program designe to improve maintenance of the unloader typ high-speed compressor, particularly in th diagnosis of compressor failures.

On the favorable side of the high-spee compressor are its compactness, and siz and weight in relation to capacity. Thes features make possible the elimination c pulleys, belts, and tension devices, permi ting the use of motors of standard speed directly connected to the compressors. An other item is the near-absence of any troub with the coupling between compressor an motor.

Pennsylvania Railroad

. . . Joins

Chicago & North Western Railway

Hudson & Manhattan Railroad Co.

Boston Metropolitan Transit Authority

Cleveland Transit System

Three of the new Pennsylvania Pioneer Commuter Cars are equipped with Westinghouse Air Brake Tread Brake Units and Cobra Shoes.

The Tread Brake Unit provides complete braking power with but one Cobra Shoe per wheel.

A total of 1600 of these units are now in service on the properties listed above.

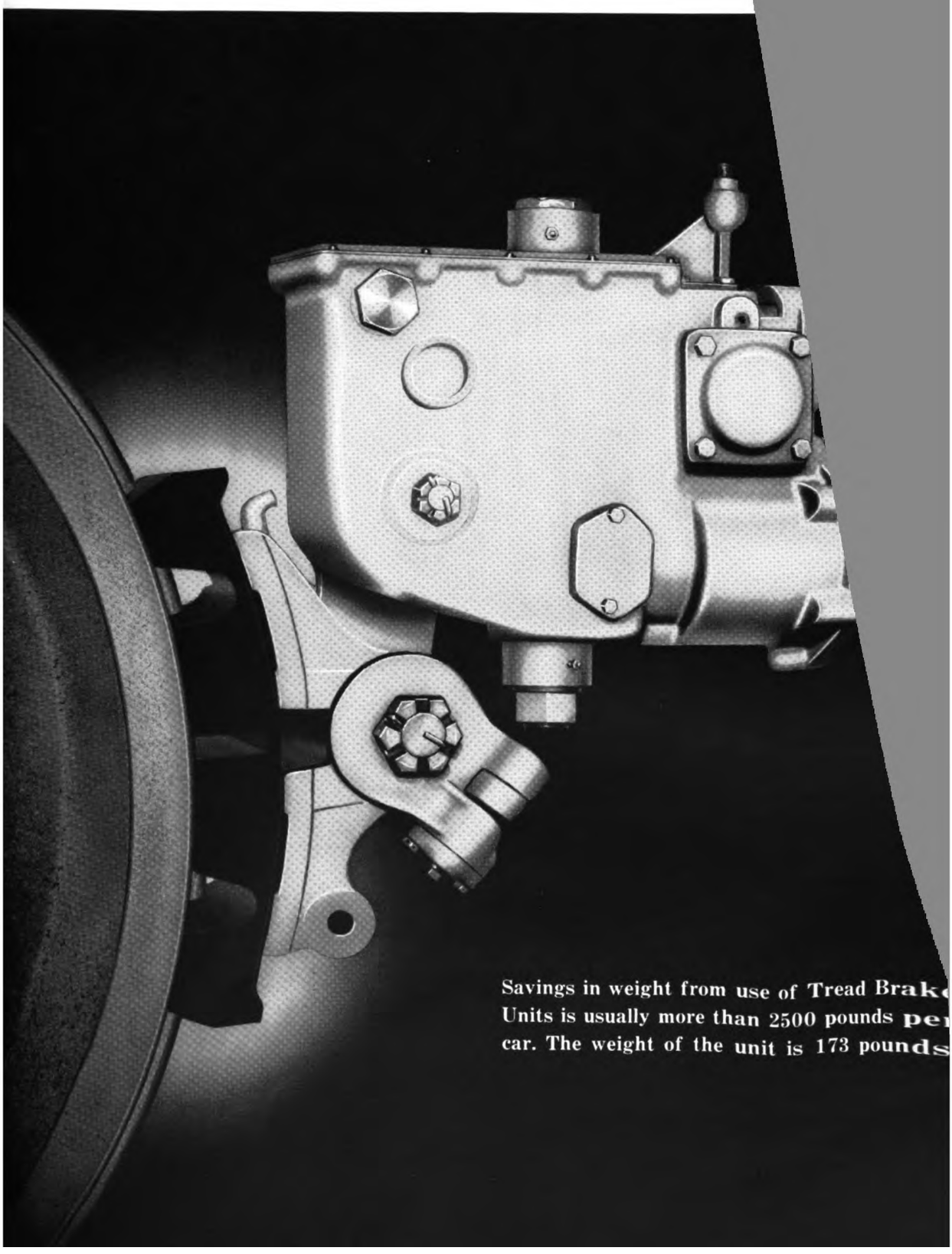
Westinghouse Air Brake COMPANY

AIR BRAKE DIVISION WILMERDING, PA.

ıstalls

read Brake Units and C

n New Commuter Cars



Savings in weight from use of Tread Brak
Units is usually more than 2500 pounds pe
car. The weight of the unit is 173 pounds

B. P. Burley, IC

C. W. Martin, B&O

F. J. Corporon, CSS&SB

L. B. Curtis, PRR

L. W. Birch, Ohio

type locomotives
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Repair Shops,
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One rail-
no cable
failed in

P. O. Lautz, AT&SF, presented the report. Mr. Fort said: "The report gives extraordinary attention to detail, covering points influencing maintenance that I didn't even know about. It is," he added, "a monumental work, and I admire the precision and care that has gone into its preparation." Mr. Stacy reported that F-M service men consider it a most desirable procedure for overhauling equipment. He added that F-M fuel pumps should be maintained by the manufacturer. P. J. Sasgen, PRR, said that the committee will consult with manufacturers when pump specifications are written.

Radio on Rolling Stock

The committee reports that within the last few months radiotelephone sets with a 64-volt, d-c transistor type power supply as an integral part of the transmitter-receiver package have been placed in service on several railroads. There are no moving parts or electron tubes in this type power supply. It has a conversion efficiency equal to or better than devices using moving parts in the same service, and preliminary indications are that maintenance expense will be negligible. It requires 1.4 to 2.2 amp when the radio is in standby condition and three to four amperes when the transmitter is in use. These current values hold true for supply voltages from about 64 volts to 85 volts.

The report was presented by P. B. Burley, IC. Mr. Fort explained how it is possible to have very high voltage peaks in battery-operated transistor transmitters, when the battery field contactor is open. These are apt to be destructive to transistors but he said the hazard may be eliminated by the application of shunting condensers.

Mr. Schmidt asked if there is a device being developed to replace vibrators and Mr. Burley replied that there will be such a device for the three-unit type of equipment.

Wiring Diagrams

The work of the Committee on Wiring Diagrams is doing much to reduce confusion and to reduce the amount of work done by railroad drafting rooms. This year's report, which is Chapter 9, is listed as "Specification for Connection Diagrams." It is presented as information, and for future manual material when the chapter is completed.

C. W. Martin presented the report. He said the AIEE Land Transportation Committee is adopting Electrical Section recommendations and passing them to the American Standards Association for all forms of transportation equipment. C. W. Roth, EMD, reported that Electrical Section wiring diagrams were endorsed by the Electro-Motive Division. A similar statement was made by H. S. Ogden, General Electric.

Section Sees Railroad Electrification

Six Budd "Pioneer III" type, mercury-rectifier m-u cars, delivered to the Penn-vania, and a control arrangement develo on the Milwaukee which permits operat electric and diesel-electric locomotives multiple were mentioned in the report Railway Electrification.

Anticipating the return of electrification American railroads at some future time Committee on Railway Electrification is ganizing its work to anticipate this. The signments make it apparent that catena power at high voltage and commercial quency is expected.

During 1957, there was much developme of electrification in foreign countries, none on the North American continent. M of the new developments are employing co mercial frequency, 50 cycles at 25,000 v using rectifier types of cars and locomotive

The report gives consideration to the parent needs of matching a new system an existing one. The problems associat with signal and communication systems being given consideration to avoid conf and unnecessary installation expense.

Characteristics of American catenary s tems are tabulated and charted. Statistics electrification systems throughout the wo have been compiled and included in the port. These show route miles, track mile voltage and system.

The final section of the report consists a review of the desirability and possibi of developing up-to-date schedules of fe for the occupancy of railroad right-of-w by electric and communication companies

The report was presented by L. B. Cu PRR. Mr. Fort wanted to know if the co mittee had followed European developme of pantagraphs and carbon contacts and w told they are under study.

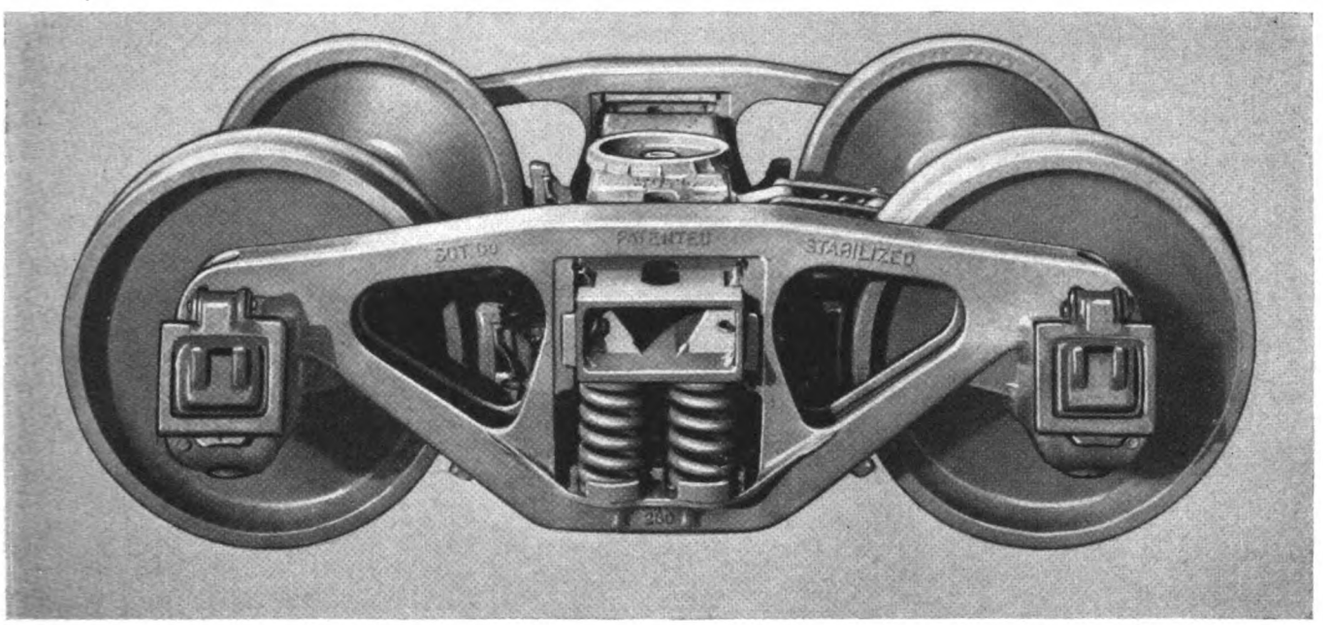
There has long been a question concern distortion in power line distribution whic might be caused by railway electrificatio E. B. Shew, Philadelphia Electric Co., sai that in the case of large power systems tests indicate that single phase unbalanced load such as might be caused by electrifi tion do not present difficulty.

R. M. Stacey, Fairbanks-Morse said company has been asked to quote on a 11,000 volt electric-diesel-electric locomoti Such a machine he said may be built in compact package and might be used in transition period changing from diesel-e tric to electric.

H. F. Brown, Gibbs & Hill, presented a re port on electrification. He said all fuel co have about doubled in the past 16 year

(*Continued on page 44*)

Experienced Car Builders BEGIN WITH



BARBER
STABILIZED TRUCKS

Today's heavier, high speed railroading demands years ahead freight car performance. Better design, better quality from rail to roof can achieve it. So, "Begin with Barber Stabilized Trucks." You provide a smoother ride, with variable friction for variable loads... protect other equipment and save on lading damage claims. Proof—*more than 475,000 Barber car sets sold*... none has ever worn out!

Standard Car Truck Company, 332 South Michigan Avenue, Chicago 4, Illinois. *In Canada:* Consolidated Equipment Company, Ltd., Montreal 2, Quebec.

J. Stair, Jr., G&H

E. M. Hastings, C&O

H. C. Cross, B&O

R. C. Welsh, PRR

F. T. Snider, Pit

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., presented the report.
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easing in favor of elec-
d roads must be alert
a competitive position.
mportant because many
ily on their coal traffic.

New Standards Are Adopted

The greater part of the report of the Committee on Electric Heating consists of specifications for electric heaters for ballast under track switches, for the installation of tubular type electric heaters for track switches and for tubular type electric heaters for track switches.

New information for ground protection systems for track switch heater installations is included. It is based on the fact that 200 ohms connected between the rails will not shunt the typical signal system. Thus, if two 100-ohm resisters are connected in series between the rails and the center point solidly grounded, a ground point is established with respect to both rails. It is then possible to connect a ground relay between the power system neutral and ground, and use it to detect grounds to the running rails. A protection system based on this principle is described in the report.

Mention is made of the use of electric radiant panels for thawing frozen iron ore in cars at Two Harbors, Minn. Results indicate substantial savings. A new and effective means of drying traction motors in place has been developed on the New York Central. J. J. Gregory, assistant to the general mechanical superintendent, locomotives, and R. L. Henderson of General Electric's Lamp Department, developed a compact dryer unit, which was fabricated by M. Chandler, assistant general foreman at the New York Central's Collinwood yards, Cleveland.

The dryer, equipped with three 120-volt, 500-watt quartz lamps and a 150-cfm blower with an adjustable air intake, is adaptable for mounting on all freight and passenger traction motors. It is designed so that all that must be done to place it in operation is to remove the top inspection cover on the motor and place the unit over the opening. It is not necessary to remove the motor from the engine, making it a valuable time-saving tool for all running maintenance shops.

Tests indicate that drying time will vary between one and six hours, depending on the amount of moisture present.

The report was presented by H. C. Cross, B&O. In response to a question, M. H. Work, NYC, reported that the use of the 200-ohm resistance across the track circuit shown in one of the diagrams in the report does not affect operation of the track circuit. It was also pointed out that symbols shown in the wiring diagram do not conform with Electrical Section standards, and it was moved that they be changed to conform.

With reference to the drying of moisture from grounded traction motors by means of infrared quartz lamps, Mr. Henderson said that radiant energy is absorbed by the
mutator bars and transmitted to the
The blower, he said, takes off surface
so that the method cures from the insi
well as the outside.

Power Supply

Specifications for standby power
have been prepared by the Committe
Power Supply for inclusion in the Ma

Rechargeable flashlight batteries
largely lost the interest of railway
this country because of cost and
in charging and servicing. The result
are no longer made by American ma
turers. New interest by the committee
bers has been created by a selfcontain
chargeable flashlight of German make
tains its own battery and charging
and is fitted with a standard attach
plug under the rear cap so that it
plugged into any standard 60-cycle
volt a-c outlet. Battery capacity is
to make committee members feel th
subject of rechargeable batteries is no

The report was presented by R. C.
Jr., PRR. J. L. Christen asked if some
of lubricant, such as plating, is used
manufacture of stand-by plugs to re
sistance in meshing. A. E. Ganzert,
National, said that rhodium plating
included for an additional cost of abo
dollar and that it is well worth the

Referring to the flashlight with a
able battery and self-contained rectifie
tioned in the report, R. L. Henderson
eral Electric, said it was important
potential buyer of such devices learn
can buy parts, or if replacements
made with standard connectors.

Wire, Cable and Insulating Materials

AAR specifications for insulated wir
been shown in parallel columns with
lent national specifications in the re
the Committee on Wire, Cable and Insu
Material and offered as manual materi
report also includes specifications for
vinyl tape. These are offered as inform

The committee reports that during
the ASA adopted Specification C8. 35
American Standard Specification for W
Resistant Wire and Cable-Polyethylene

After January 1, 1958, the color gree
used exclusively for ground in all p
cords.

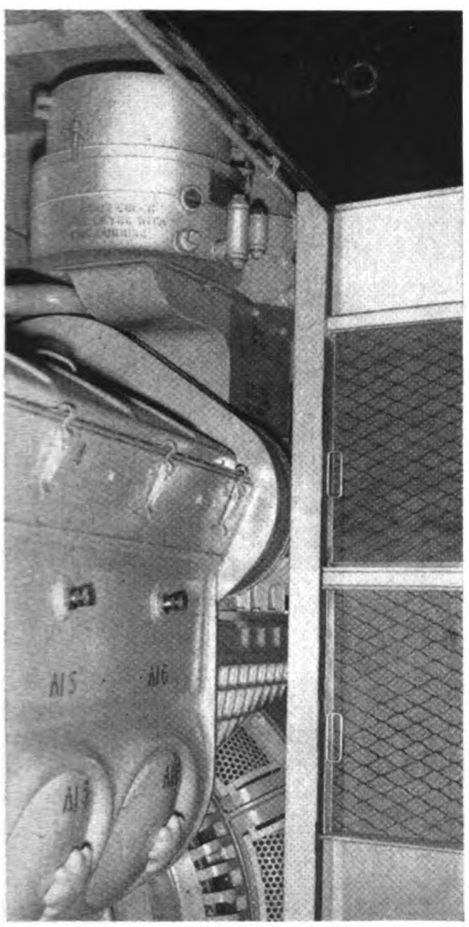
Because it is highly thermal plast
report states that wire with polyvinyl
ride insulation should not be used for
motive wiring.

In presenting the report, F. T.

(*Continued on page 46*)

HOW TO INSURE LONGER ENGINE LIFE

for less cost than it takes to overhaul 2 or 3 power assemblies



On EMD–GP9 1750 hp. locomotives

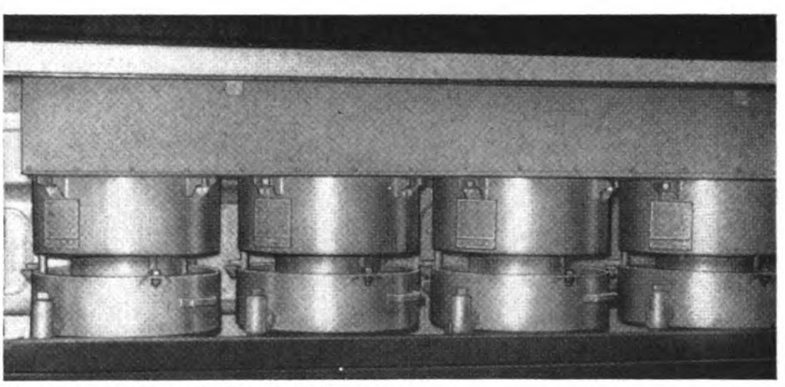
These installations show how over 100 leading railroads save money on maintenance of diesel locomotive engines.

By using Air-Maze oil bath filters they remove up to 97% of all objectionable dirt from intake air.

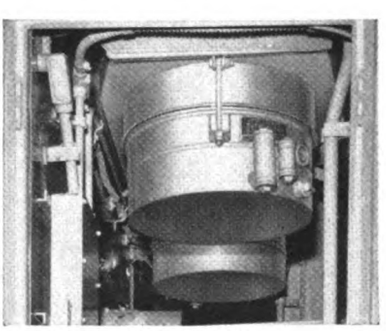
According to test reports, piston ring and cylinder liner wear are reduced 50 to 75%.

Maintenance is negligible since the Air-Maze oil bath filters go as much as a year with no attention except for periodic checking of oil level.

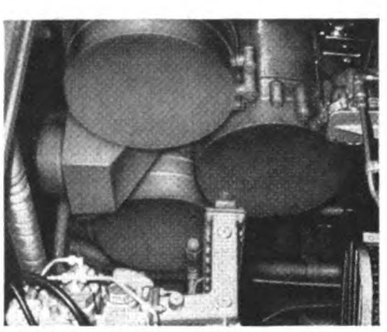
Contact your locomotive builder or write us for details. The Air-Maze Corporation, Cleveland 28, Ohio. Dept. RL-8.



On Fairbanks Morse 2400 hp. Trainmasters



On General Electric U18C 1980 hp. locomotives



On Alco 1800 hp. switchers

GEARED TO PROGRESS RPI MEMBER

The biggest names in diesels are protected by Air-Maze filters

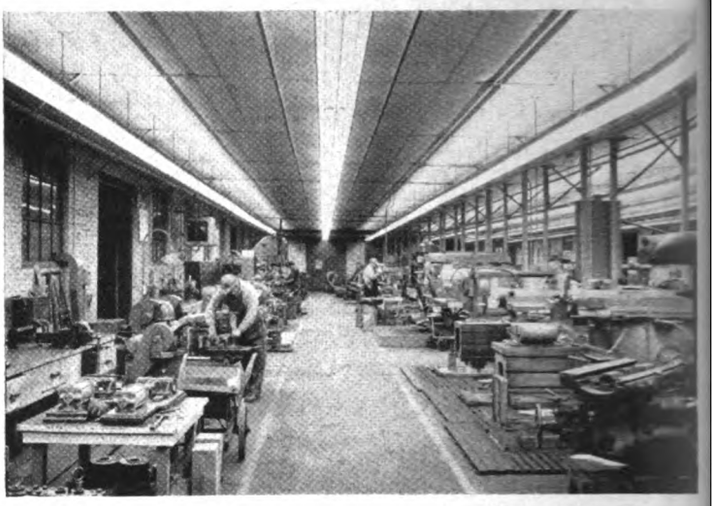
ENGINE CAR FILTERS
CAR BODY FILTERS

AIR-MAZE

LUBE OIL FILTERS
PASSENGER CAR FILTERS

The Filter Engineers

BEFORE new lighting was installed, illumination intensity in New York Central's Ashtabula, Ohio, shop was between 2 and 20 footcandles.



AFTER fluorescent fixtures were installed, light level went to 60 footcandles and machines no longer required individual light fixtures.

PRR, detailed specifications for the Manual. Mr. Martin asked: "Will we ever have a report on pressure type terminals?" Mr. Snider said that would be very difficult and it may be necessary to list methods of application developed by the several manufacturers.

Illumination

In recent years much attention has been given to the lighting of large yards. The report calls attention to overlooked conditions in small yards which frequently involve greater hazards than those in the large yards. It recommends that attention be given to the applicability of mercury vapor street lighting luminaires along the switching lead tracks.

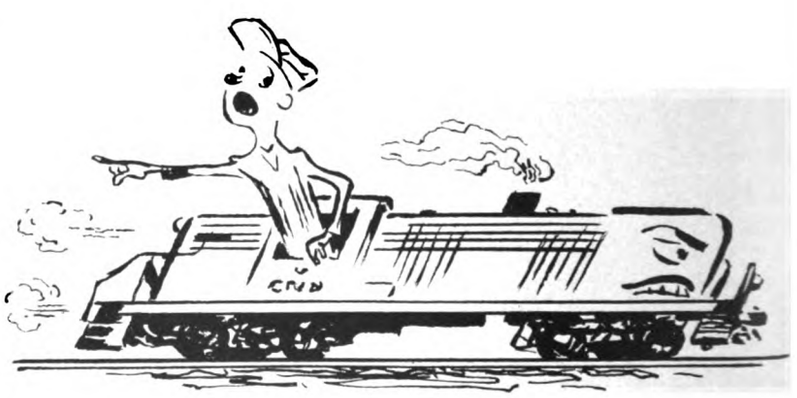
As a part of its recent relighting program, the New York Central relighted its scrap and reclamation shop at Ashtabula, Ohio. Incandescent RLM fixtures were replaced with continuous rows of two-lamp fluorescent fixtures and illumination intensities were raised from values between 2 and 20, to 60 footcandles.

A black light inspection unit developed on the Baltimore & Ohio makes it possible to detect fuel leaks and to distinguish between fuel oil and lubricating oil. A fluorescent dye added to fuel oil being pumped through the system causes leaking oil to appear in brilliant color under the black light.

From the Diesel Maintainer's Note Book

The Perverse Reverser

B. A. Striver



STRANGE THINGS can happen in a diesel locomotive control circuit when grounds develop. Recently, the reverser of an Alco road switcher would stay only in the *Forward* position.

This condition first developed at an outlying point. It was decided to disconnect the reverser control air pipe from the air manifold, and bring the locomotive to her home terminal by operating the reverser manually. A wood peg was used to plug the manifold.

A check of control circuits showed a full positive ground on the fuel pump circuit which includes the fan control panel and its circuit. A bare wire was found resting against the fan control switch bracket. When this was cleared, the reverser again operated normally.

While it was known that there were other grounds on the control circuits, no apparent difficulties resulted. A shortage of locomotives made it necessary to put this one back in service immediately.

About a week later, the reverser again began to stay in the *Forward* position. Now, in addition to this, the *CVS* speed relay came in at first throttle position. It should be energized from third to eighth throttle notches only. There were also indications that the remote control of the steam trainline cut-off was involved.

The most likely place for the No. *8* wire to the *Forward* coil of the reverser magnet and the No. *7* wire of the positive side of the *CVS* coil to be shorted or grounded would be at the terminal strip for the m-u receptacles in a box under the back platform of the locomotive. It was found that there was an almost full ground on the batteries which had to be cleared before control circuit grounds could be checked. The batteries were washed and dried with rags.

The deck plate and cover of the terminal strip box were removed and an accumulation of rust and moisture was found. The terminal strips were in poor condition and it was decided to remove the wires from the strips and splice them through. This reduced the control ground, and cleared up the difficulty.

NEW THEW-LORAIN

"Square Tubular-Chord" Crane Boom

The Moto-crane, designed and built by The Thew Shovel Company of Lorain, Ohio, offers a uniquely light, powerful, maneuverable boom. Completely fabricated of Shelby Seamless Mechanical Tubing, the boom consists of four main chords of square tubular construction, reinforced by lacing of round tubing. In sizes, the main chords range from 2" x 2" x .189" wall to 4" x 4" x .250" wall.

The advantages of this type of construction are manifold. The square cross section of the four main chord members gives the greatest radius of gyration for column strength, 15% better than round members, 90% better than angles. This radius is the factor that gives square chord sections the greatest column strength per lineal foot of weight. The result is a weight savings of 20 to 30%, greater strength, and increased lifting capacity. It also permits handling and traveling with longer booms.

USS and Shelby are trademarks

Why Shelby Seamless Mechanical Tubing was chosen...

Primarily, it offers the ultimate in strength and rigidity in proportion to its size and weight. Secondly, it is shock-absorbent, uniform throughout, dimensionally accurate, and possesses excellent machining and superior welding properties. It is produced under rigid standards, and is available in a generous range of diameters, wall thicknesses, various shapes and steel analyses.

Contact our engineers. Let them help you to adapt Shelby Seamless Mechanical Tubing to your specifications.

The 35TM Moto-crane unit with straight 105-foot boom and a 20-foot tip extension. Some of these booms have been as long as 200 feet.

National Tube Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • United States Steel Supply Division • United States Steel Export Company, New York

9 Roll Them Out Like New

Armature Inspection and Test

WHEN THE ARMATURE is out of the frame, its general condition should be checked. Obvious signs of trouble—thrown solder, burned commutator bars, deep holes burned into the windings, serious loosening of the bands, or mechanical damage—are easily detected. Some armatures may be so bad that preliminary inspection shows they must be rewound. Others, which look all right, will need further checking. The troubles, their visible symptoms, and reactions to standard tests must be understood.

INSULATION RESISTANCE TEST. A glance at the "as received" record, plus an insulation resistance test, will show whether the armature can stand "hi-potting." If the armature is dry and its resistance is below a specified value (usually 15 to 20 megohms), cleaning is necessary. If, after cleaning, baking and cooling, the value is 100 megohms or higher, the armature may be "hi-potted" and treated in varnish.

HIGH POTENTIAL TESTS. Too much cannot be said about the dangers of putting high potential on a winding having low insulation resistance. Many machines that have broken down in "hi-pot" could have been saved if they had been thoroughly cleaned before testing. Machines not thoroughly cleaned may break down before the prescribed voltage is attained, or before it has been held for the required length of time. When this happens to a machine which appears to be clean, the trouble may be caused by an accumulation of carbon dust, oil or other contamination on the creepage surfaces that are hard to reach.

A good rule is to strive for perfection in cleaning. With proper equipment and know-how, it is usually possible to bring the insulation resistance up to infinity. However, it's not enough to get infinite resistance under dry shop conditions. There may still be dirt in those hard-to-reach pockets that will cause trouble when it gets damp.

To prove this, take a small spray gun or atomizer and spray water into some of those dull looking spots. If the insulation resistance drops sharply, dirt is present. Do the same on new, well-varnished insulation, and note how the resistance holds up. This shows why you can get a high megger reading, even with dirt present—provided it is dry. Although such a machine may pass the regular hipot test, this doesn't mean that it will stand up under adverse service conditions. Above all, you don't want to varnish over this dirt—that would only make matters worse.

Some shops prefer the newer d-c high-potential testing sets to the standard a-c 60-cycle testers. Others are still investi-

(*Continued on page 50*)

This is the ninth article in the series covering heavy maintenance of locomotive electrical equipment.

Part 9 is written by W. F. Davis, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

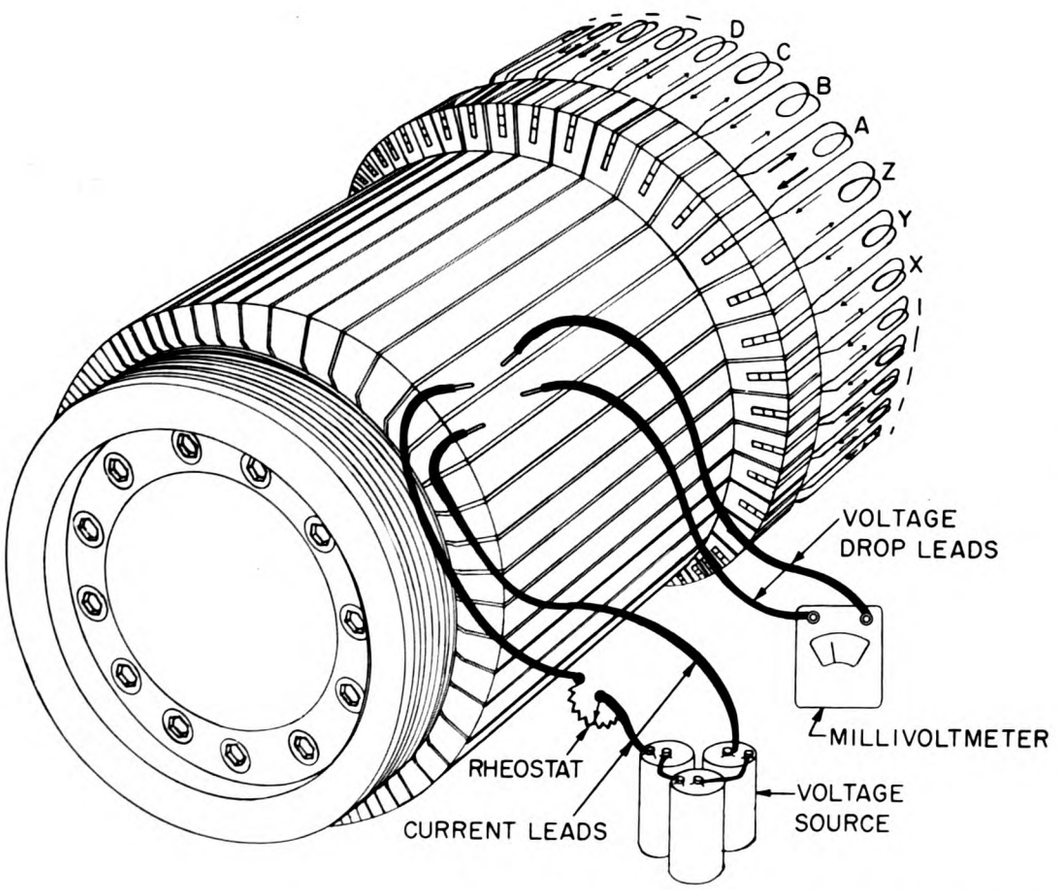
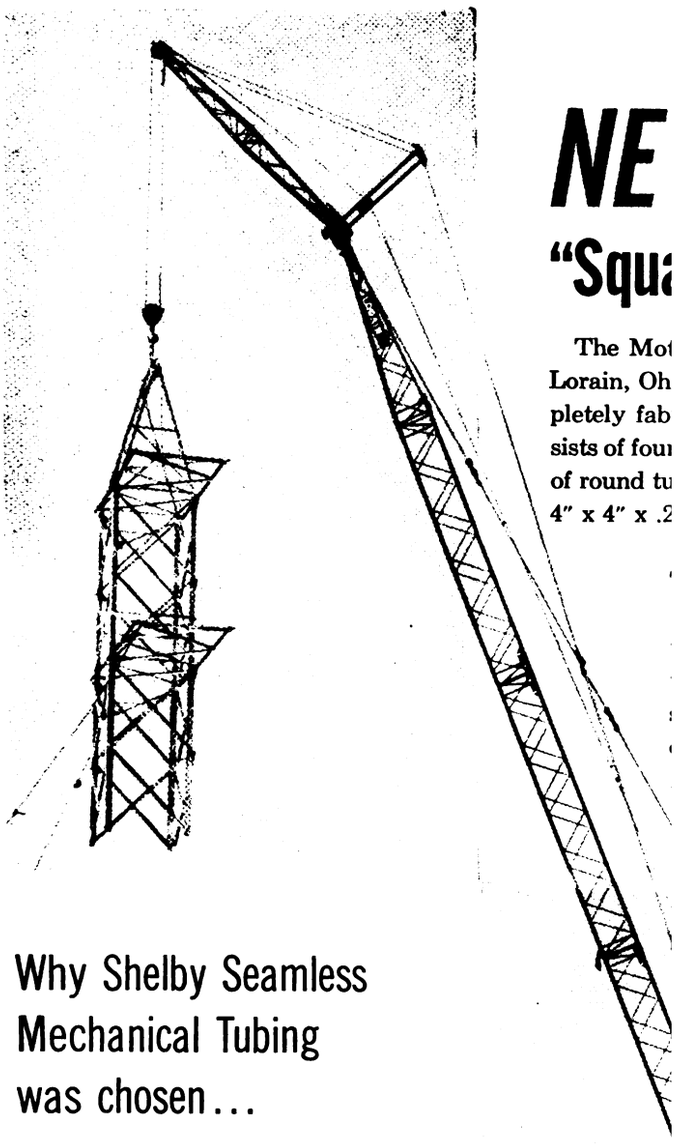


Fig. 1—Bar-to-bar resistance test locates high resistance joints.



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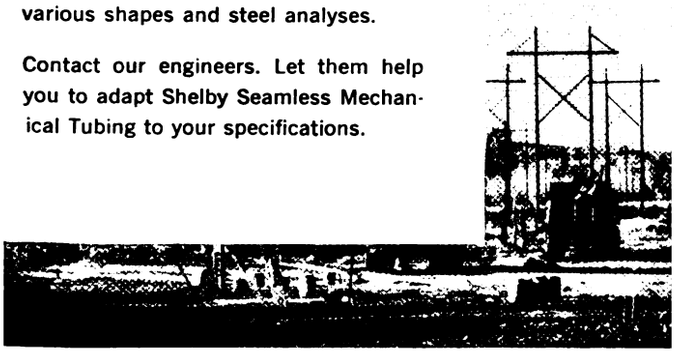
Why Shelby Seamless Mechanical Tubing was chosen...

Primarily, it offers the ultimate in strength and rigidity in proportion to its size and weight. Secondly, it is shock-absorbent, uniform throughout, dimensionally accurate, and possesses excellent machining and superior welding properties. It is produced under rigid standards, and is available in a generous range of diameters, wall thicknesses, various shapes and steel analyses.

Contact our engineers. Let them help you to adapt Shelby Seamless Mechanical Tubing to your specifications.



The 35TM Moto-crane unit with straight 105-foot boom and a 20-

National Tube Division of US

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • U

9 Roll Them Out Like New

Armature Inspection and Test

ARMATURE is out of the frame, its general uld be checked. Obvious signs of trouble—, burned commutator bars, deep holes burned ngs, serious loosening of the bands, or mechan-are easily detected. Some armatures may be so minary inspection shows they must be rewound. n look all right, will need further checking. their visible symptoms, and reactions to stand-st be understood.

N RESISTANCE TEST. A glance at the "as re-d, plus an insulation resistance test, will show rmature can stand "hi-potting." If the armature s resistance is below a specified value (usually gohms), cleaning is necessary. If, after cleaning, ooling, the value is 100 megohms or higher, the y be "hi-potted" and treated in varnish.

ENTIAL TESTS. Too much cannot be said about of putting high potential on a winding having on resistance. Many machines that have broken i-pot" could have been saved if they had been cleaned before testing. Machines not thoroughly cleaned may break down before the prescribed voltage attained, or before it has been held for the required length of time. When this happens to a machine which appears be clean, the trouble may be caused by an accumulation carbon dust, oil or other contamination on the creepage surfaces that are hard to reach.

A good rule is to strive for perfection in cleaning. With proper equipment and know-how, it is usually possible bring the insulation resistance up to infinity. However not enough to get infinite resistance under dry shop conditions. There may still be dirt in those hard-to-reach pockets that will cause trouble when it gets damp.

To prove this, take a small spray gun or atomizer spray water into some of those dull looking spots. If insulation resistance drops sharply, dirt is present. Do same on new, well-varnished insulation, and note how resistance holds up. This shows why you can get a high megger reading, even with dirt present—provided it is dry. Although such a machine may pass the regular hipot test this doesn't mean that it will stand up under adverse service conditions. Above all, you don't want to varnish over the dirt—that would only make matters worse.

Some shops prefer the newer d-c high-potential testing to the standard a-c 60-cycle testers. Others are still in-

(*Continued on page 50*)

ninth article in the series covering heavy maintenance of loco-al equipment.

itten by W. F. Davis, Locomotive and Car Equipment Depart-Electric Company, Erie, Pa.

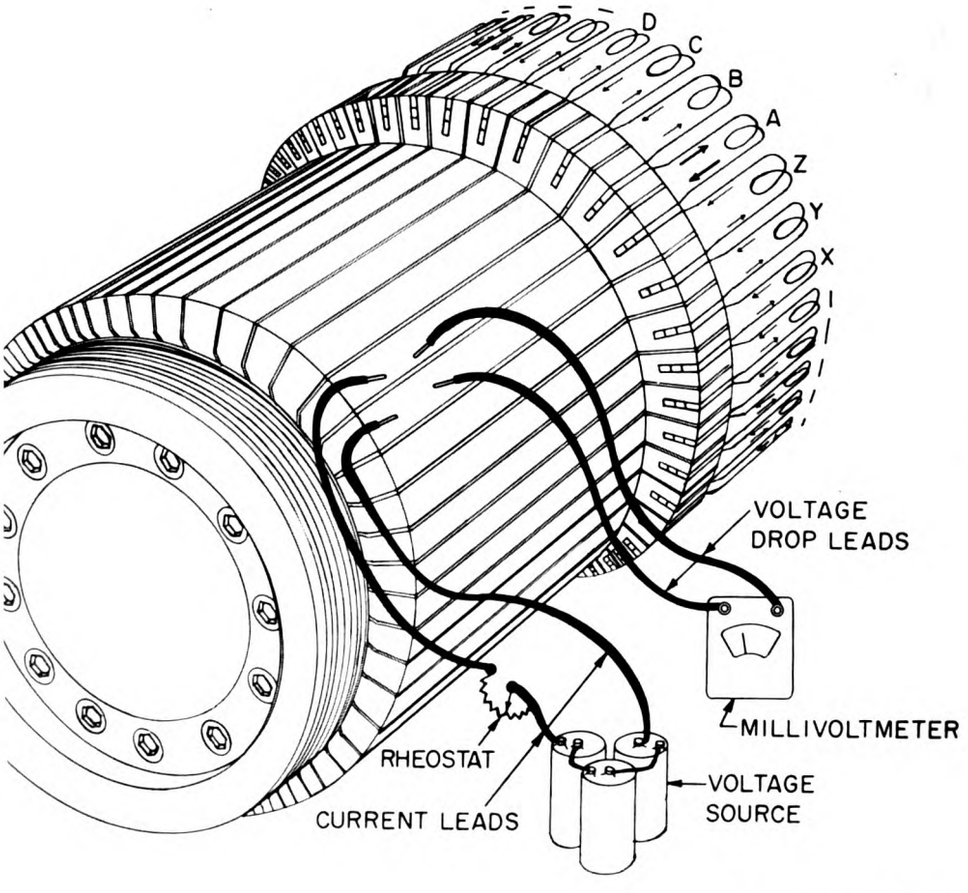
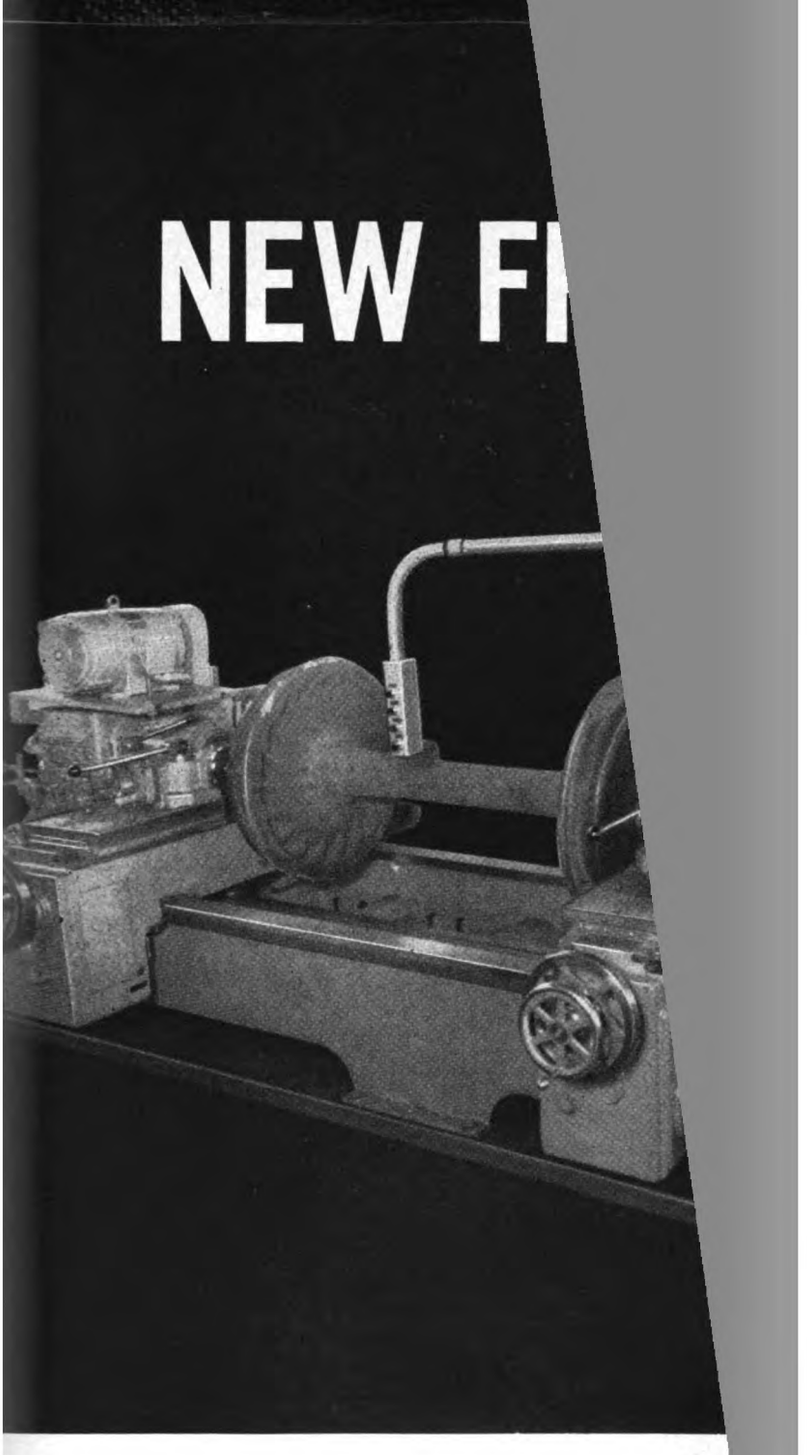


Fig. 1—Bar-to-bar resistance test locates high resistance joints.

NEW FI



All-purpose Niles
and hydraulic bur

To the world's most complete line of railroad machine shop tools, Niles has now added a new end-drive axle journal turning and burnishing lath e. All-purpose in every respect, this new lathe can accommodate—with equal facility and economy—new and used A.A.R. car wheel sets or axles, diesel axles, or diesel locomotive wheel sets with drive gear attached.

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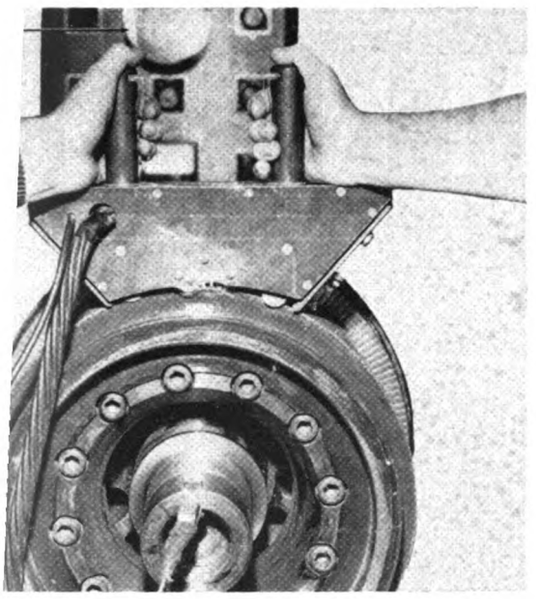


nparison testing equipment, and its typical oscilloscope :tect faults not found in measuring bar-to-bar resistance.

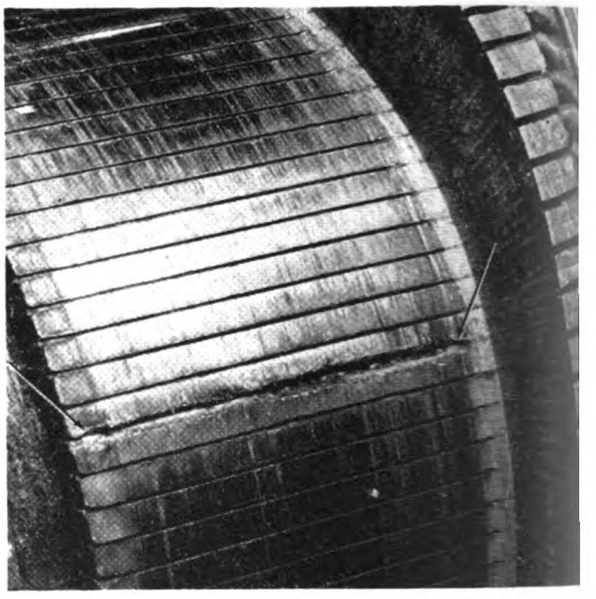


Fig. 3—Commutator burning resulting from an open-circuited arma produces this trench.

rits of d-c testing. One significant advantage o indicate the condition of the insulation by eakage current characteristic. This permits the pped before breakdown occurs, avoiding un- ıirs. One point still in question is the relation test voltages. A value of about 1.6 times the widely used compromise. After a d-c hipot an e remains in the machine. This should be / connecting the commutator to ground.

esistance Test

-bar resistance test is used as a check for : connections and open or short circuits in the ding. Various forms of equipment are used. on which they work is sketched in Fig. 1. ry current from a battery to the commutator. ıtat is used to adjust the current to a suitable r pair of leads is connected to a millivoltmeter. ıre touched to a pair of adjacent bars, the he connected armature coil is indicated by the In this test, current passes through coil A and battery in Fig. 1. A parallel path normally all the other coils (*B, C, ... Y,* Z) in series. as many times the resistance of coil *A,* so it ttle current. Unless the circuit through coil *A* ies about 99 per cent of the current. indicates the resistance of this coil and its A more elaborate equipment, called a com- metimes used where the volume of work is ts of a tester and a device for making contact adjacent commutator bars. The tester contains rheostat, and a sensitive light-beam galvanom- f fingers in the contact device is connected to ɔly, and another pair to the galvanometer. eadings around the commutator it is possible ıe resistances of all the coils. The rheostat to give a reading near the mid-point of the his will be about the same for all good coils. scale 5 per cent or more on a pair of bars, poor connection in one of the leads. ould be marked for repair. High resistance netimes give off-scale readings. Don't hold than necessary to note the off-scale reading ıay be damaged. Low readings are rare, but if encountered they indicate a short-circuited coil. Th should also be marked for repair.

This test can detect insulation faults not discernibl the bar-to-bar resistance test because it applies a much voltage. A peak of about 500 volts a-c can be applied be adjacent bars. The "surge" pattern is indicated on an loscope screen, Fig. 2, when the voltage is applied operator checks by comparison all around the comm watching the scope pattern. If a fault is indicated, the p will collapse as shown in Fig. 2.

This test also indicates any short circuit between mutator bars. Normal dirt in the mica slots shows sparking on the commutator. Carbon dust, dirt or c particles should be cleaned out before testing.

The surge test applies several hundred volts be adjacent bars. Therefore the equipment is specially des to protect users. The electrodes are mounted in a yoke h two handles fitted with safety grips. The operator must these before the circuit is complete and voltage is ap In general, use the same precautions when making thi as when using any high-potential equipment. Be careft to let any part of the body touch the commutator.

Mechanical Inspection and Repairs

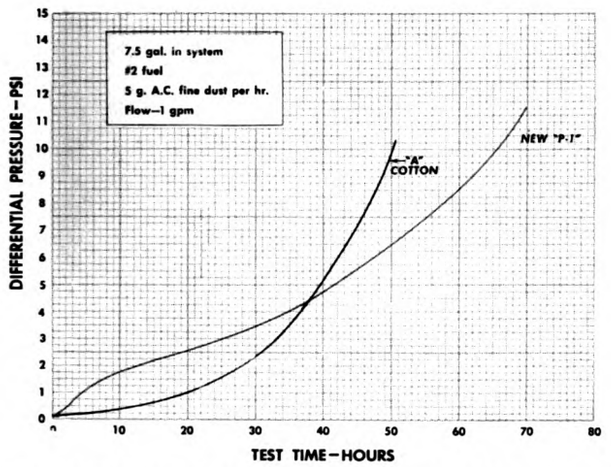
Look, as well as test. Many faults, such as short-circ or open-circuited coils will cause discoloration from exce heat. Check by smell for burned or scorched insula Look for telltale marks on the commutator. An open ci will usually show up as a deep trench burned out bet two bars (Fig. 3). Heating may result from high resist connections or short circuits in the armature winding. affects the particular coil and insulation, and may also r in discoloration and annealing of the connected commu bar.

Check carefully all around the commutator for w faults. If you suspect soft bars, use a hardness tester sim to the Shore Scleroscope (Fig. 4). The tester should be squarely and solidly in position over the bar so that pellet falls freely on a smooth surface. The hardness v is read on the scale as the height to which the pellet bou after it has struck the surface of the bar. The reading may as high as 20 or more, but 12 to 15 is satisfactory. A rea of less than 10 indicates annealed copper. Usually such

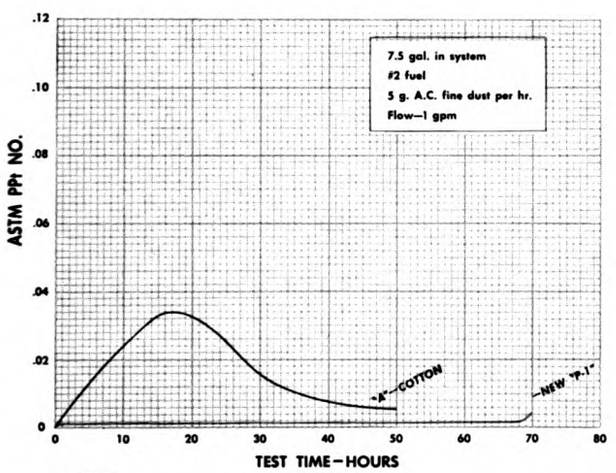
(Continued on page 53)

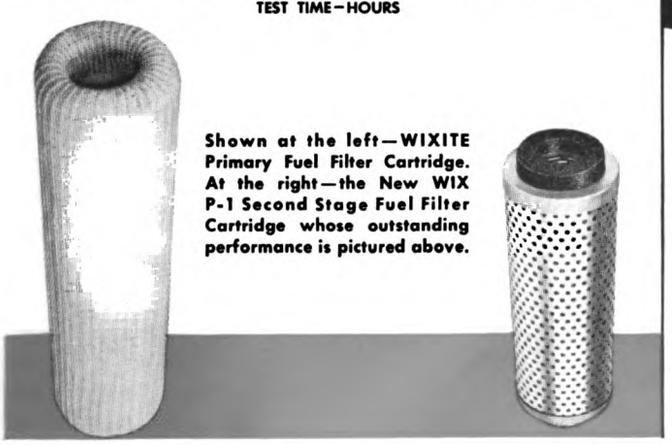
Applied Research in Filtration Saves Money for Railroads, too!

NEW CLEANLINESS IN FUEL AND LUBRICATING OILS EFFECTS MAJOR ECONOMIES IN DIESEL OPERATION



Test to demonstrate the comparative efficiency (retention of contaminants) and flow characteristics (pressure drop) of standard 2nd stage fuel filter cartridge "A" versus the new WIX P-1 pleated paper cartridge. With a condemnation limit of 10 psi, cartridge "A" indicates on the chart above a life cycle of 50 hours versus 66 hours for the new WIX development. Note that, throughout its longer service life, the WIX cartridge never exceeds trace amounts as opposed to the performance of cartridge "A" as shown on chart below.





Shown at the left—WIXITE Primary Fuel Filter Cartridge. At the right—the New WIX P-1 Second Stage Fuel Filter Cartridge whose outstanding performance is pictured above.

When a few specks, no larger than the point of a pin, can disrupt the entire schedule of a railroad system, the economic importance of clean fuel oil is well illustrated — but, in only one of its aspects. Engine trouble, caused by fuel failure, is a catastrophe. The day in and day out erosion of vital engine parts, which is the progressive penalty of contaminants in lubricating oil, may be equally costly. Combined, these problems represent significant sums in the annual operations budget.

Research and development by WIX, based on years of study, have made marked progress in the areas of both fuel and lubricating oil filtration. WIX Filter Cartridges were the first to supplant the old hand-filled waste packed filters which today are pretty generally recognized as "extravagant" economies.

Today WIX offers comprehensive coverage of all oil filtration needs on diesel locomotives . . . lubrication, primary and secondary stage fuel. This coverage embraces many filtering media so that engineering can prescribe the precise filtering formula to suit the engine and its characteristics as well as the service or environment in which it operates.

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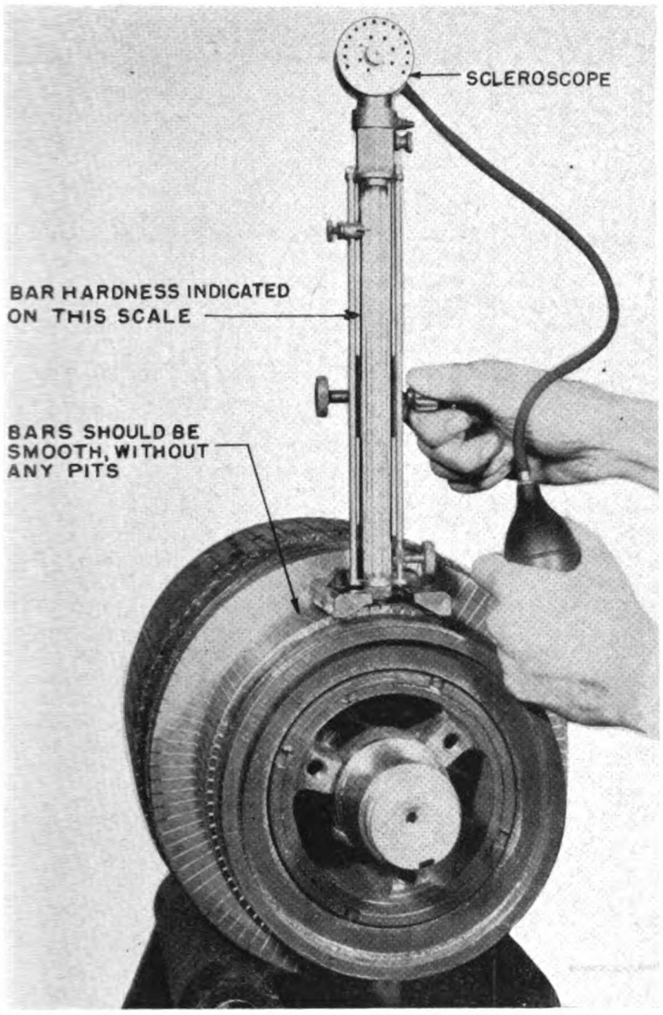


ig. 4—Scleroscope can be used to test commutator bar hardness.

ars will also show visible signs of lifting and excessive wear. 'urning the commutator in a lathe will be only a temporary olution. Such a commutator will require repairs to be de- cribed later.

Lifted or high-resistance leads may be detected visibly see Fig. 5), as well as by the bar-to-bar resistance test.)ccasional defects usually can be repaired by resoldering, arefully lifting the leads just enough to clean and flux the oint, and then drifting them into place. Special rosin fluxes re best for this purpose. If the usual acid fluxes found round a shop must be used, be careful to keep them off he insulation and be sure to wash away any surplus because lectrical leakage faults could result.

Solder throwing usually results from overheating in service. f you find it, look for further damage, such as loose bands, nd shrunken wedges. If most of the bars have thrown older, and tests show only a moderately high resistance, a omplete resoldering job may be done. If the machine has run or a while with this defect, conditions are different. The igh resistance joints may then be so badly oxidized that a uccessful resoldering job is economically impossible. The rmature will probably have to be rewound.

If, however, the winding is relatively new and in good ondition it may be worth saving. Repairs can then by made y lifting all the top leads just enough to clean the risers nd leads. The bottom leads are then cracked open with a himming knife enough to allow flux to enter the joints. The eads are then reassembled, drifted and resoldered. Any oldering job should be checked later with a bar-to-bar test o insure adequate repair.

If the bands have not already been removed to clean

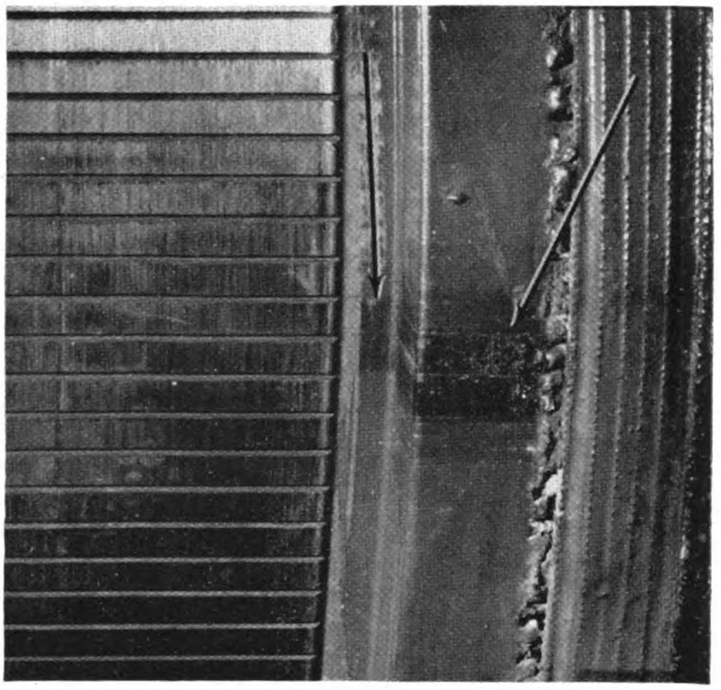


Fig. 5—Overheating due to lifted or high resistance leads causes discoloring.

the coils underneath, they should be carefully checked for looseness by tapping. A light ball-peen hammer is better for this than the usual shop hammer. Judgment and experience, plus a familiarity with the pattern of insulation wear usually accompanying relaxed bands, is necessary to detect this trouble in its early stages. Anyone can spot a "punky" loose band, but by then it has probably gone too far for help. The advanced stage of insulation wear it reveals probably spells an early job of rewinding.

Some shops prefer not to reband armatures, except on rewind, and therefore tolerate operation with relaxed bands. Others, by early rebanding, may be replacing bands that are still good. In general, the particular type of service encountered, and the experience of the individual railroad will play a large part in deciding whether the band stays or is replaced during basic overhaul.

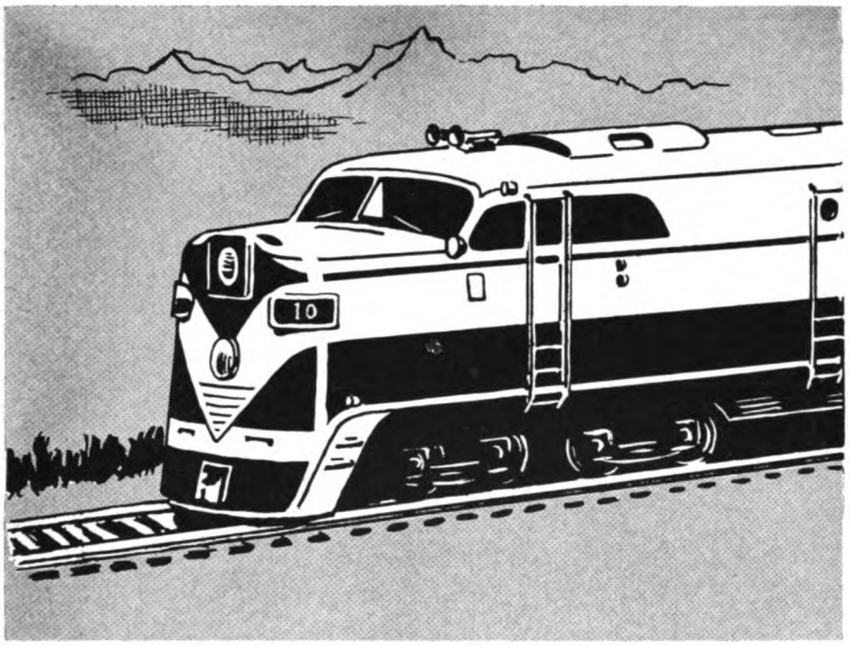
Other Tests

Most shops take advantage of every opportunity to Magnaflux the armature shaft. Because it can be easily done by utilizing the residual magnetism in traction motor shafts, this test should be made. The shaft taper, and bearing and collar fits should be closely inspected. Diameters can easily be measured, the taper "blued" to gage, and indicator runouts measured in a lathe.

If the armature is not slated for a rewind, the core laminations should now be examined for loose or broken teeth, and the slot wedges checked for tightness. The core stacking should be tapped radially and through the longitudinal ventilation openings to detect looseness which may require tightening or welding.

Electrical repairs requiring the lifting of a few coils from the slots and reinsulation of top grounds can usually be made. The work should be done by an experienced winder having the "know-how" for the job and the necessary special tools. Commutator work should be restricted to tightening, turning and sloting.

An open circuit, short circuit or ground that develops in service usually burns a substantial "rat hole" in the winding before it is detected. This requires extensive repairs, including stripping of the winding, core and commutator repairs. These will be detailed in succeeding chapters.



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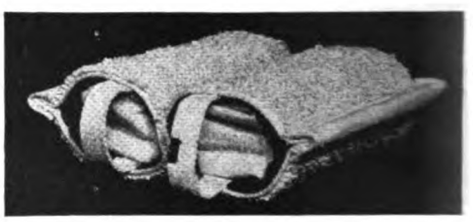
What's New

(*Continued from page 18*)

manently attached to the straps pass around grooved quadrants at ends of restraining beams and are fastened to grab hooks on the face of the beam. These are connected to shock absorbers which, in turn, are connected to equalizers. The equalizers automatically adjust for chain length and pull. Turn buckles on the two inner restraining beams at the door of the car are used to pull the beams tightly against the lading and distribute load evenly on the four chains. The box car device is designed for lift truck loading.

On the flat car, channels bolted to the side sills take the place of the steel straps and the shock absorber assemblies are anchored to each side channel. A single ⅞-in. alloy chain connects the shock absorber assembly to the grabhooks at the ends of the turnbuckle screws. Because the flat car is designed for crane loading, both the end and inner beams have turnbuckles to tighten the palletized load. Removable covers are provided to fit outside of the side channels and rest on the car deck for weather protection. *Brandon Equipment Company, Inc., Dept. RLC, 332 S. Michigan ave., Chicago 4.*



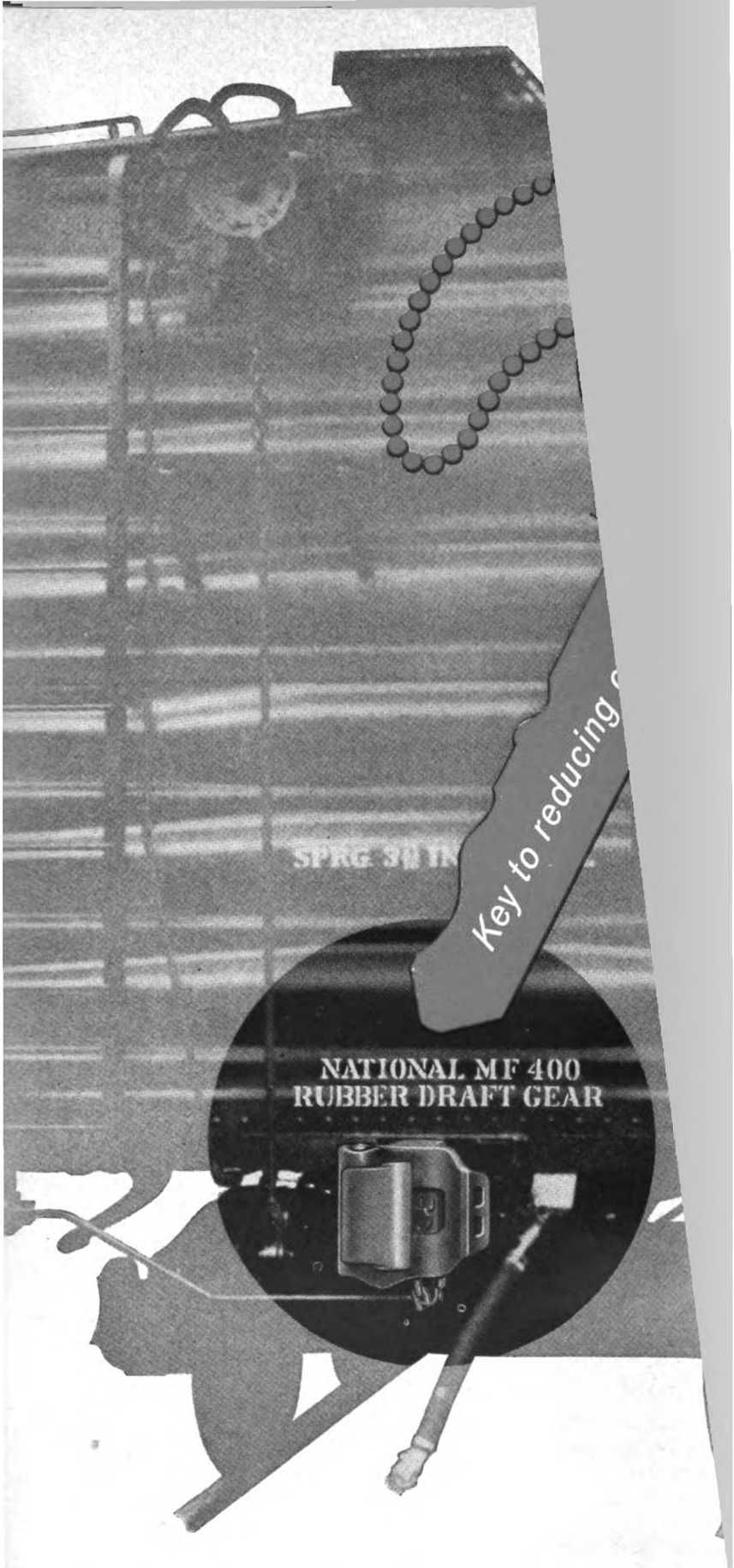
Journal Lubricator

The Albert twin type reversible lubricating pad consists of an outer blanket of 100 per cent cotton fibers entirely tufted with a highly absorbent lamp type wicking. It is backed up with a special felt to insure immediate absorption of oil. The felt is sewed to the wicking and the outer wrap for instant wicking from the oil reservoir. Canvas duck, double edge wrapped to prevent wear on the sides, encloses a reinforced tempered blue steel spring assembly to hold the pad at proper height. The spring assembly is said to be unaffected by oil and heat and keeps the pad in contact with the journal at all times. The canvas back edging is double stitched to prevent end wear. Handles are wicked, and sewed across the entire pad providing additional strength for easy application and removal. A brass tag on the handle identifies the size. The pad has been approved by the AAR for test applications. *Albert Manufacturing Company, Dept. RLC, 4912 Hohman ave., Hammond, Ind.*

Metal Surface Prepaint Treatment

"Safe-Tee" Solvent F.O.-190, when used as a prepaint treatment, is said to leave a slightly roughened surface which is passivated

(*Continued on page 56*)



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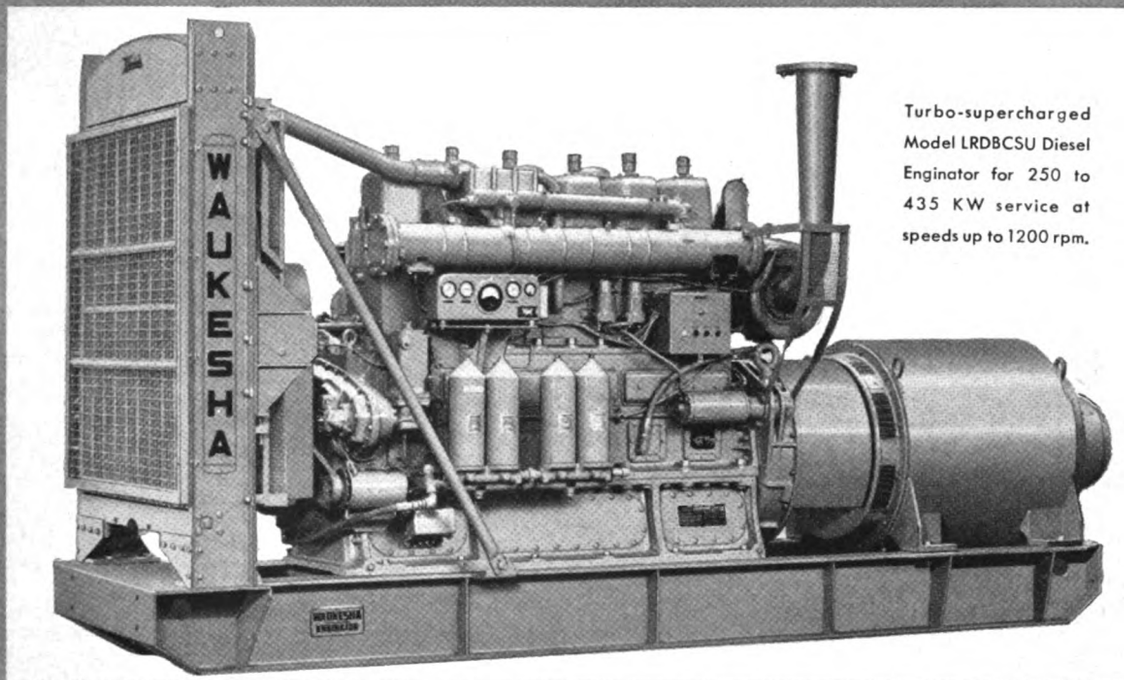

Turbo-supercharged Model LRDBCSU Diesel Enginator for 250 to 435 KW service at speeds up to 1200 rpm.

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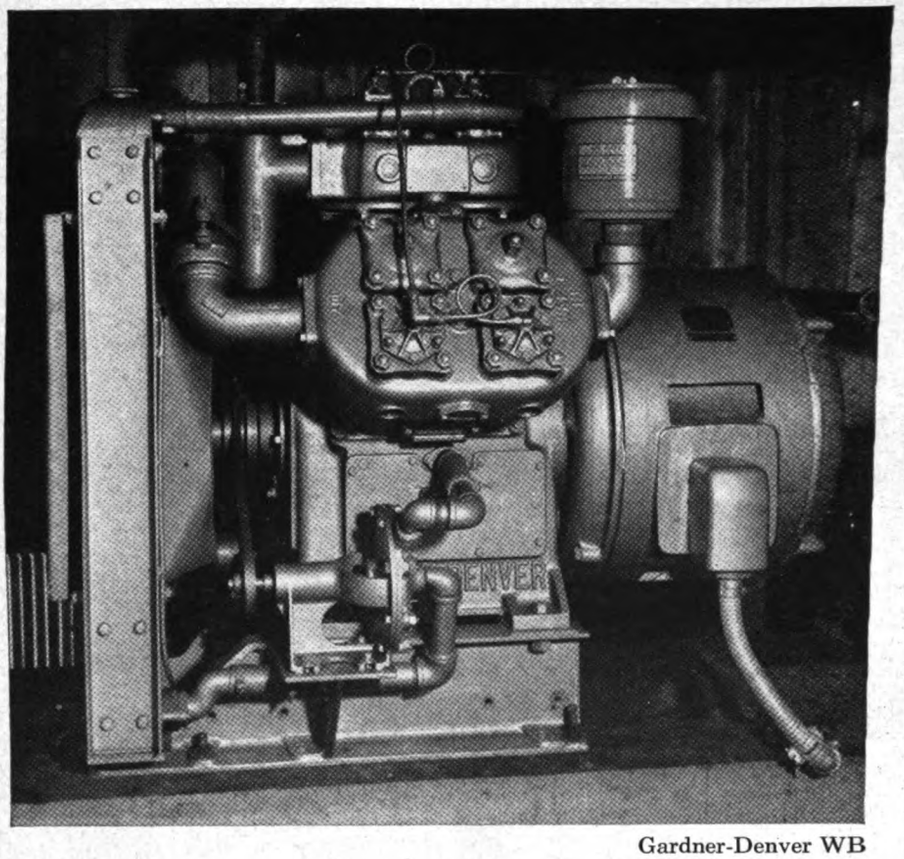
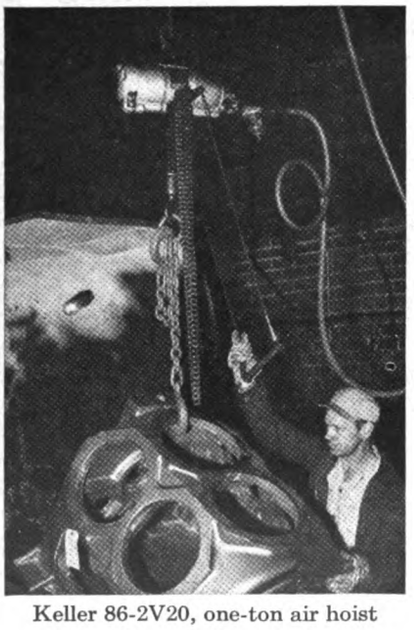


Gardner-Denver WB

Maintain with air... Gardner-Denver air and tools



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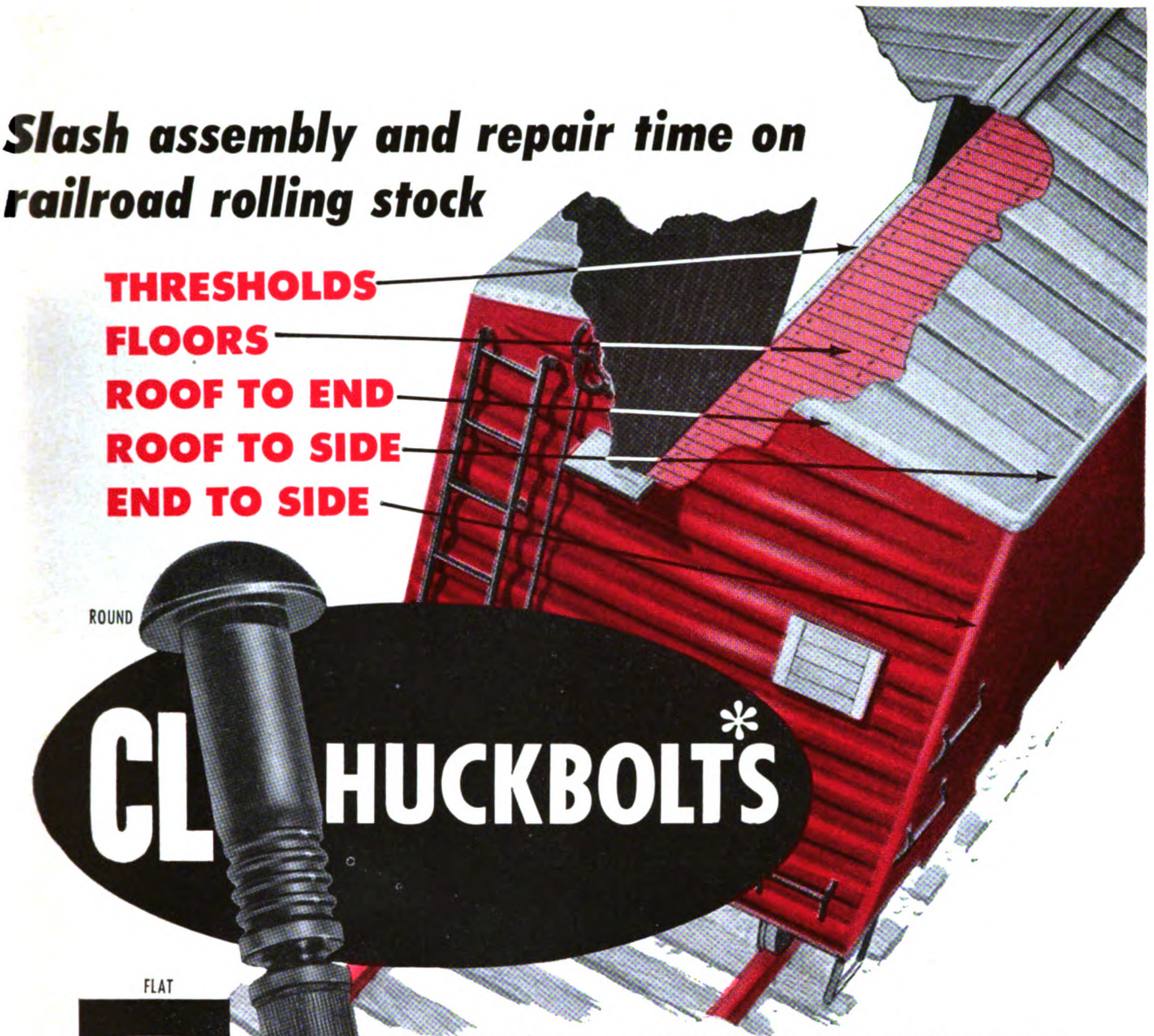

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- LP-Gas Lines • Air Brakes
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Made in a wide variety of sizes and types for hundreds of commercial and industrial uses, Stratoflex detachable and reusable fittings simplify maintenance and assure leak-proof connections under extreme temperature variations. Stratoflex hose provides the flexibility, small bend radii and durability essential for dependable service.

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SF7-8

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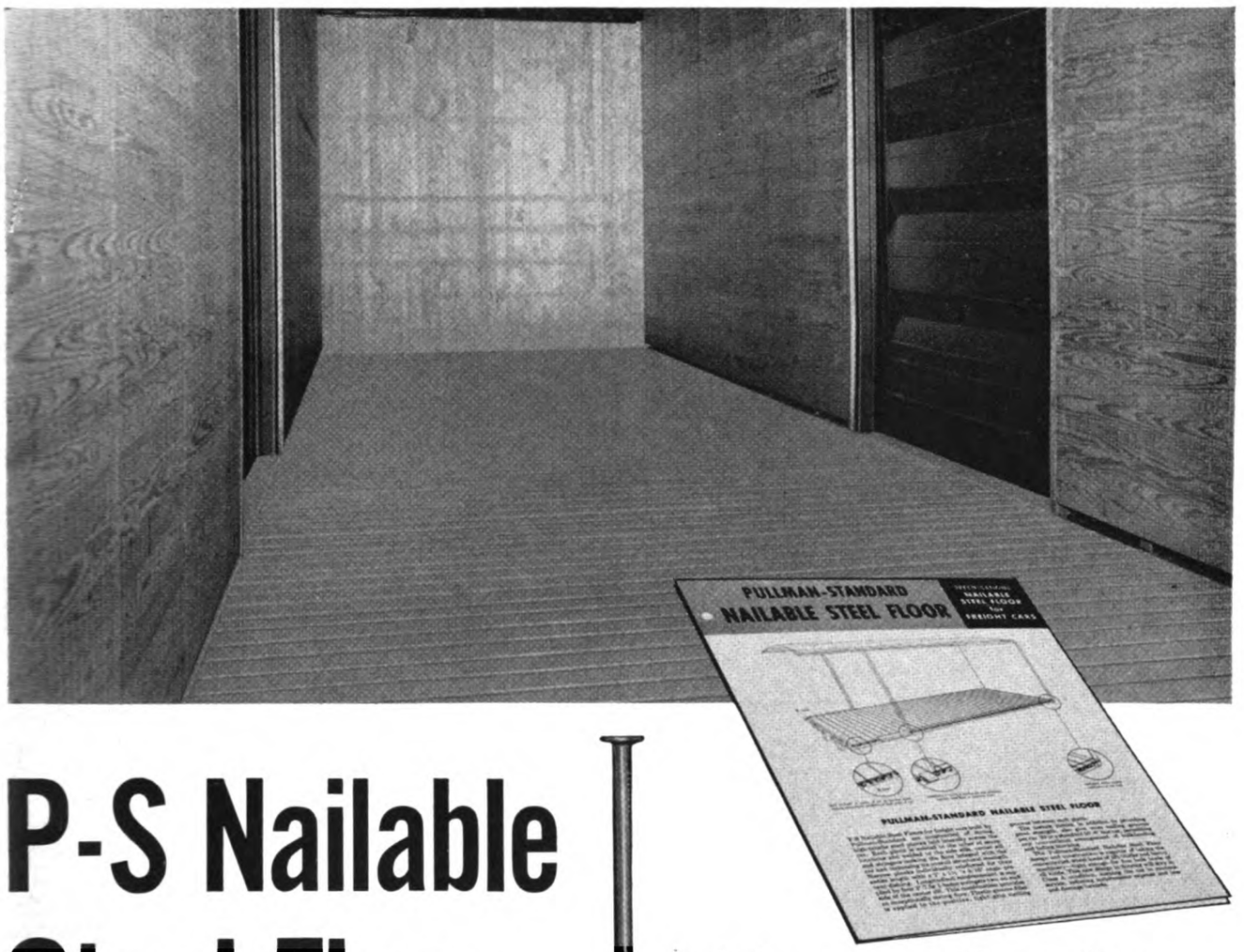


P-S Nailable Steel Floor

Before you specify any floor read about P-S floor benefits in this booklet

Take just a moment to discover the benefits of Pullman-Standard Nailable Steel Floor. Write for a copy of this fact-filled booklet. Study it . . . compare it to *any* floor. Compare strength, durability, nail-holding power, long-range economy. Whatever comparisons you make, you'll find P-S Nailable Steel Floor gives your railroad the greatest floor value on the market.

PULLMAN-STANDARD

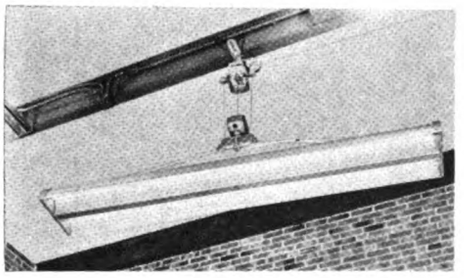
CAR MANUFACTURING COMPANY

200 South Michigan Avenue, Chicago 4, Illinois

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO

can be joined with a single size, simplifying the inventory problem.

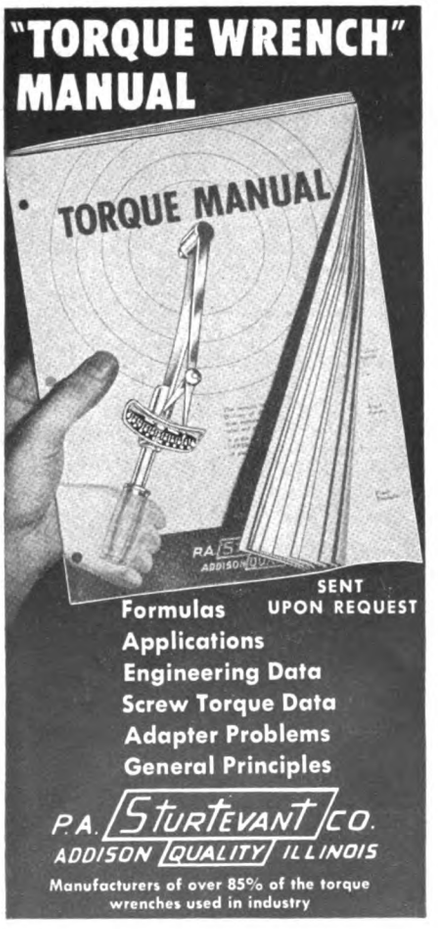
It is available in 3/16-, 1/4-, 5/16-, 3/8- and 1/2-in. nominal pin diameters and in all head styles for metal-to-metal application. *Huck Manufacturing Company, Dept. RLC,* 23704 *Woodward ave., Pleasant Ridge, Mich.*



Luminaire Hanger

This disconnecting and lowering hanger is for use with hi-bay fluorescent, mercury and incandescent luminaires or clusters weighing from 60 to 120 lb. It features a newly designed multiple-fall pulley system with a 3-to-1 mechanical advantage for handline operation, and permits one workman to lower, relamp, clean and then reposition heavy hi-bay lights within minutes. There are no climbing or electrical dangers because all work is accomplished at floor level with a dead fixture.

These Triplex hangers are available with a wide variety of specially designed suspension assemblies for **diversif** *Thompson Electric* ***Compa*** *P.O. Box 873-BR, Clevelan*



Insulation Test Instrument

The VON 100 KV (5 millia 100,000 volts) d-c insulation weighs only 80 lb. It tests a sulation condition of large tors, transformers, cables, a electronic assemblies, reducin breakdown.

The instrument is powere rectifiers and uses no tubes. also in 150-, 200-, and 250-k *son Company, Dept. RLC, Newark 2, N.J.*

Letters—*Cont'd from*

Mandatory Bearing Rep

To the Editor:

Summer, to most, is a seaso To the railroad man, howev spells out just two words: "Hot

I believe that in journal l search, too much emphasis has box packing as the source of t the new lubricators are essenti ing the hot-box problem, I be long as the present AAR cond for inspecting solid bearings sta always have a hot-box probl inspection is left up to the b any repair track for his own i of Interchange Rule 66. Regard contour, if a bearing falls short

Personal Mentic

Central of Georgia.—*Macon, Ga* Cowan, toolroom foreman, appoi foreman, locomotive shop, succ N. Cagle, retired.

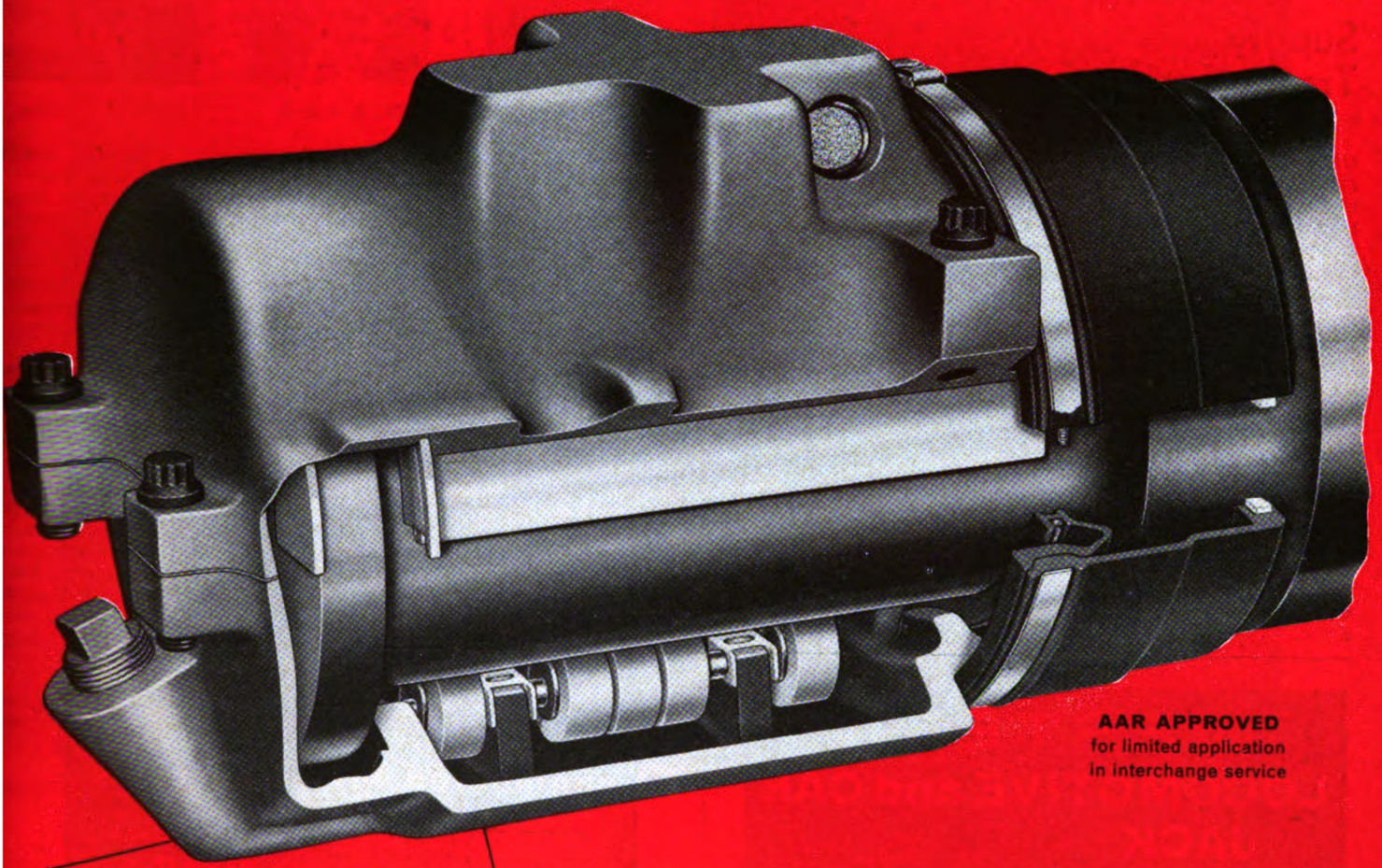
Canadian National.—*Moncton, N* Bourgeois, appointed foreman i shop. Formerly car foreman at Loup.

Chicago & North Western.—*Chicag* A. Bowlds appointed mechanica car.

Chicago Great Western.—*Oelwein,* Moran appointed assistant sup motive power and equipment, G. H. Johnson, retired. H. P. appointed general car foreman, Mr. Moran.

Delaware & Hudson.—*Albany, N.Y* C. Woodard, road foreman of eng toga-Champlain Division, appoin road foreman. *Oneonta, N.Y.:* M Davis, road foreman of engines, Pen

PROGRESS REPORT



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for limited application
in interchange service

CLEVITE Sealed Sleeve Bearing Cartridge

...new, permanent, soundly engineered and economical journal bearing conversion for freight cars.

...Doing a GOOD Job!

Tough road and laboratory tests under severest service and simulated conditions show the performance of Clevite Cartridges to be far more satisfactory than ever expected.

In actual application checks, Clevite Cartridges proved they require less modification of equipment and are installed at lower cost than any other permanent conversion.

Keep your eye on CLEVITE!

DISTRIBUTED BY:

STANDARD CAR TRUCK COMPANY

332 S. Michigan Ave., Chicago 4, Illinois. ***In Canada:*** **Consolidated Equipment Co., Ltd., Montreal 2, Quebec**

The CLEVITE Bearing Cartridge is a development of Cleveland Graphite Bronze division of Clevite Corporation

Pennsylvania.—*Philadelphia:* WARREN R. ELSEY, vice president, retired. Mr. Elsey mechanical engineer in 1936.

Southern.—*Atlanta, Ga.:* DONNIS L. TALBERT appointed assistant foreman.

Supply Trade Notes

R. M. Covert

C. H. Leet

W. A. Baltzell

Robert W. Pittman

GENERAL ELECTRIC COMPANY.—*Oscar L. Dunn* appointed general manager, Motor and Generator Division, at Schenectady, N. Y., succeeding *James M. Crawford,* vice-president and general manager retired.

■

ACF INDUSTRIES, INC., AMERICAN CAR & FOUNDRY DIVISION.—*Robert L. Evans* appointed vice-president in charge of engineering.

■

PENNSALT CHEMICALS CORPORATION.—*Robert R. Pierce,* sales manager, appointed manager, and *James H. Cogshall,* sales manager, Corrosion Engineering Products Department. Mr. Cogshall previously sales engineer.

■

THRALL CAR MANUFACTURING COMPANY.—*Charles A. Mapp* appointed assistant vice-president—sales. Formerly assistant manager, Railroad Division, Fairbanks Morse & Co.

UNION ASBESTOS & RUBBER CO.—*Robert M. Covert,* assistant to vice-president in charge of Equipment Specialties Division, appointed manager, Equipco Hand Brake Division, succeeding *Arthur F. O'Connor,* retired.

■

ELECTRIC STORAGE BATTERY COMPANY.—*C. H. Leet,* Exide Industrial sales branch official in Chicago area, heads marketing of Electric Products battery-charging equipment, Exide Industrial Division, *John W. Weight,* New York branch sales manager, retired.

■

RAILROAD FRICTION PRODUCTS CORPORATION.—San Francisco office moved to 812 Industrial Indemnity building, 155 Sansome street, Zone 4.

■

K S M PRODUCTS, INC.—Canadian plant and sales office, known as "K S M of Canada, Ltd.," established at 379 Bering avenue, Toronto, Ont.

OAKITE PRODUCTS, INC.—*J. Justin Basch* appointed to new position of marketing vice-president, responsible for sales, engineering and marketing research. Formerly vice-president for research and product development. *William A. Baltzell,* assistant sales manager, appointed industrial sales manager. *Dr. Clarence Bremer,* director of research, appointed technical director.

■

ALCO PRODUCTS, INC.—*Robert W. Pittman* appointed sales manager for transportation products and services, and *Robert H. Binkerd,* sales manager, industrial equipment, spring and forge division.

■

PULLMAN-STANDARD CAR MANUFACTURING COMPANY—Second phase of a multi-million dollar expansion-improvement program under way at Bessemer, Ala., freight-car plant will add about 35,000 sq ft

(*Continued on page 66*)

WESTERN
LOCOMOTIVE and CAR
JACK
lifts capacity
loads easier

WESTERN has made the first major change in Locomotive and Car Journal Jacks by adding TIMKEN tapered thrust roller bearings, replacing ball bearings. This major improvement means reduced friction, greater speed, easier operation and less maintenance . . . available in 25, 35 and 50 ton capacities. Aluminum or malleable steel housings available in 25 or 35 ton models.

8018

Write for Bulletin No. 1957

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America's foremost engineered lettering tools

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designed to reduce your present costs

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Used today by 1/3rd of the Nation's leading Railroads . .

Spray it— STENCILS

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Easy to apply. No skill required. Produces the most accurate and durable type of lettering, numerals, medallion, and other types of markings. Adds long life to your identification or advertising on all your equipment . . .

Whatever your lettering problems may be regarding identification, advertising, reflective or non-reflective, the DEMP-NOCK LETTERING SYSTEMS can help you get the job done in less time.

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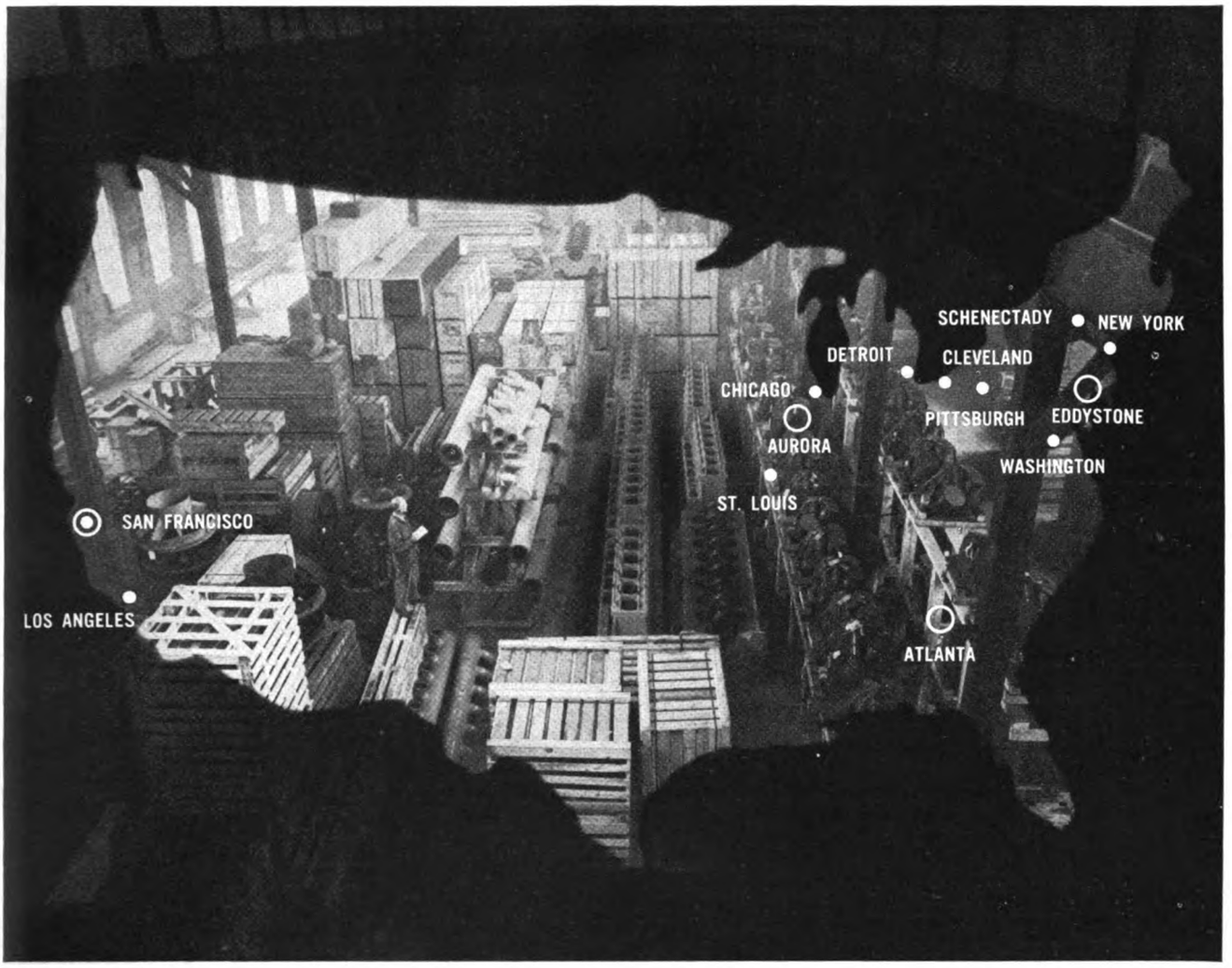


● Sales Offices ○ Renewal Parts Warehouse

Shown above is one of the huge diesel parts warehouses at Eddystone

Just a word from you sets the wheels in motion... and Baldwin diesel renewal parts are on their way!

Today, as always, Baldwin provides the ultimate in both parts and service for its thousands of diesel locomotives throughout the world. Only from us can you get exact duplicates of the original components of your Baldwin locomotive. Each Baldwin renewal part is made, like the original, by skilled workers and to the same high standards to assure you longer, trouble-free performance.

Swift service on Baldwin diesel parts is supplied by four strategically located warehouses, all geared for immediate handling of your needs. And remember that there is a nearby B-L-H district sales office always at your service.

BALDWIN · LIMA · HAMILTON

Eddystone Division

Philadelphia 42, Pa.

Hydraulic turbines • Weldments • Dump cars • Nonferrous castings • Special machinery • Bending rolls • Machine tools

of manufacturing area, enabling P-S to turn out 2,000 tons of freight-car parts per month while maintaining its capacity building schedule of new freight cars.

■

WESTINGHOUSE AIR BRAKE COMPANY, AIR BRAKE DIVISION.—*W. W. Wagner*, Chicago representative, appointed representative in St. Paul. *D. R. Phillips*, service engineer, appointed representative in western district; headquarters, Chicago.

San Francisco offices moved to 812 Industrial Indemnity building, 155 Sansome street.

■

JOURNAPAK CORPORATION. — *Security Railway Products Company* reappointed a distributor in the United States for Journapak.

■

C & D BATTERIES, INC.—*Joel Scallen*, 6319 Humboldt ave., Minneapolis, representing C & D in Minneapolis area.

■

TEXAS COMPANY.—*J. C. Droke* appointed manager of railway sales at New York, succeeding *J. B. Flynn*, retired. *D. C. Akers* succeeds Mr. Droke as assistant sales manager. Mr. Akers formerly assistant division sales manager, Chicago Division, railway sales.

■

CORNING GLASS WORKS.—*R. Dale Sweigart* appointed manager of newly created Industrial Components Sales Department formed by merger of Railroad and Industrial Sales and Appliance Parts Sales departments.

■

JOHN A ROEBLINGS SONS CORPORATION.—*Charles A. Wagner*, assistant manager of sales, appointed Philadelphia district manager, Wire Rope Division.

■

A. M. BYERS COMPANY.—*John G. Cumming* appointed manager, southwestern division, with headquarters in Houston, Tex. Following appointed service engineers: *R. E. Beisler* and *R. Spurgin*, Chicago; *N. J. Cremonese*, Silver Springs, Md; *G. F. Grey* and *W. O. Williams*, Houston; *M. E. Hanley*, New York; *L. H. Hawks*, Boston; *E. M. Jones*, Pensacola, Fla.; *K. E. MacDonald*, Cleveland, and *L. L. Swaney*, Pittsburgh.

Obituary

J. GARDNER BROOKS, manager of sales, United States Steel Corporation, Indianapolis, died May 8 of a heart attack.

HELPS FROM MANUFACTURERS

The following compilation of literature—in pamphlets and data sheets—is offered railroad men by manufacturers to the r industry. To receive the desired info write direct to the manufacturer.

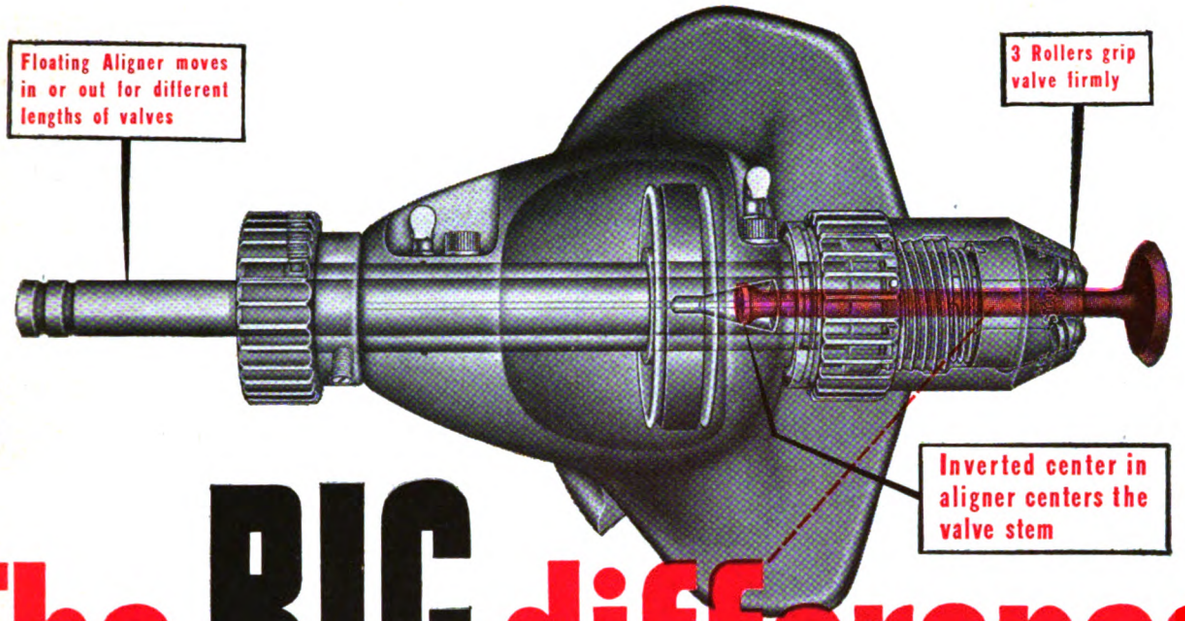
CRIB OPERATIONS. 4-page folder, K "Simplify Tool Crib Operations," desc new three-way tool crib control syste eliminating the "lost tool" problem. *Remington Rand Division, Sperry Ran poration,* Dept. RLC, 315 Fourth ave. York 10).

SILICONE RUBBER INSUL CABLES. 16-page "National Electric Sil Silicone Rubber Insulated Cables railroad design and structural enginee cusses indivdual specfying factors, inc performance data, service life, electrica acteristics, suggested applications, an results. (Write: Advertising Departmer *tional Electric Products Corporation,* RLC, 2 Gateway Center, Pittsburgh 2

EP LUBRICANT. 8-page Bulletin N contains a chart for machine-shop pe showing where and how Molykote lub should be applied. (Write: *Alpha-M Corporation,* Dept. RLC, 65 Harvar Stamford, Conn.)

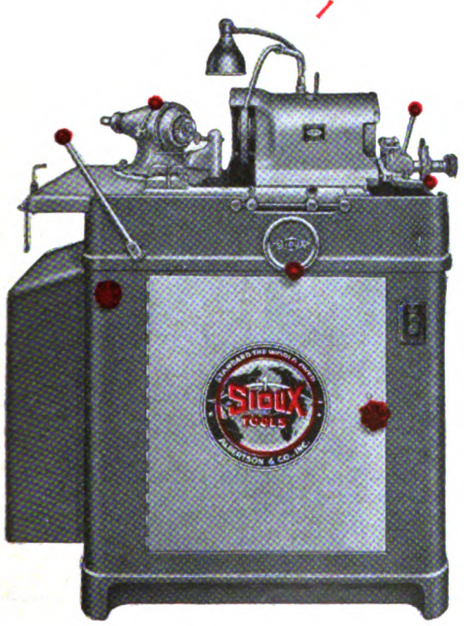
SPECIALTY ALLOYS AND FL "Users" catalog folder briefs data nee selecting specialty alloys and fluxes. steel, aluminum and aluminum alloy iron, copper and copper-bearing alloys nesium, nickel, monel, stainless ste (Write: *All-State Welding Alloys Co* Dept. RLC, 249-55 Ferris ave., White N. Y.)

NEPCOZONE INSULATION FOR AND CABLE. 27-page handbook of insulation contains an analysis of ch structure of butyl insulation and a d tion of manufacturing processes. Char technical listings in table form giv about Nepcozone insulation's electrical



The BIG difference

is in the SIOUX QUICK-ACTING ROLLER CHUCK!



IF you had to choose one feature making the largest contribution to the speed and accuracy of the Sioux Valve Face Grinding Machine it probably would be the quick-acting, easily cleaned, roller chuck. The inverted center floating aligner holds the valve accurately in the position in which it operates in the engine while valves are ground to within .001". It's fast, easy and accurate.

But as in all fine machinery, there is precision in a multitude of details. Belts absorb vibration . . . a cast iron base provides rigidity and weight . . . way bars are precision made, hardened and ground to close limits, and wet grinding eliminates heat and distortion.

For over 25 years men who have to lay down their hard earned money have been comparing and choosing the machine they liked best. The results are that today there are more Sioux Valve Face Grinding Machines in use than all others combined. Buy Sioux and you buy the finest.

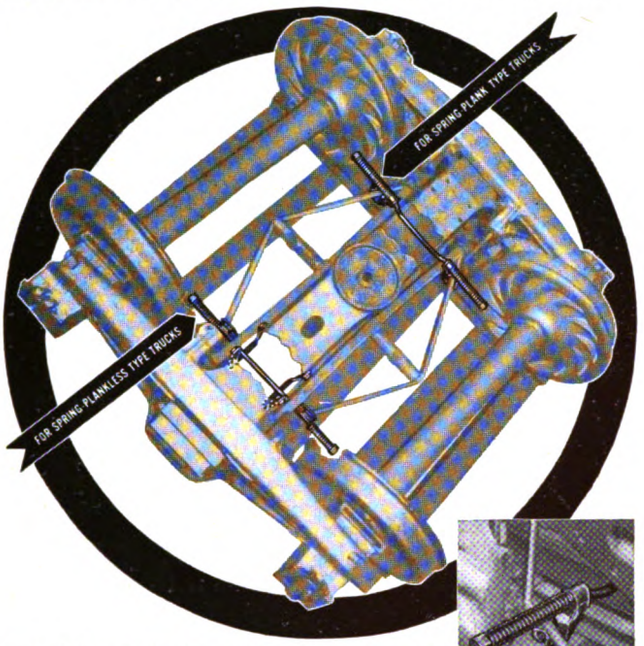
SIOUX

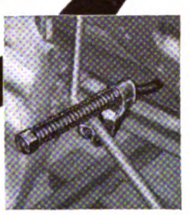
ALBERTSON & CO., INC.

SIOUX CITY, IOWA, U.S.A.

NEW AIR IMPACT WRENCHES • *NEW* AIR SCREWDRIVERS • *NEW* "PELICAN" NUT ACCUMULATORS • ELECTRIC IMPACT WRENCHES • DRILLS • GRINDERS • SANDERS • POLISHERS • VALVE FACE GRINDING MACHINES • SCREWDRIVERS • PORTABLE SAWS • FLEXIBLE SHAFTS • ABRASIVE DISCS

THE IMPROVED GRIPCO
BRAKE BEAM SAFETY SUPPORT





SPRING-PLANK TYPE

The Gripco Brake Beam Safety Support provides the greatest safety at lowest cost. Its dependability has been proven over years of actual service. **Gripco Safety Supports are low in original cost, low in application cost and low in maintenance cost, even after years of service.**

SPRING-PLANKLESS TYPE
(Safety Loops Included)

ENGINEERING IMPROVEMENTS

1. One design fits both 5'-6" and 5'-8" wheel base trucks.
2. One rod length and one spring length. One interchangeable casting fits both spring plank and spring plankless trucks.
3. Ideal for interchange repairs. New design permits easy and fast applications under all conditions. Nuts need not be removed to apply or remove the support.

OUTSTANDING FEATURES

1. An inexpensive trouble-free support for Rebuilt Car Programs.
2. Designed for spring plank and spring plankless trucks. Spring plankless trucks require safety loops which can be bolted, riveted or welded to the bolster.
3. Supports the brake beam in the event of brake beam or hanger failure.
4. Holds brake beam in horizontal position.
5. Holds brake shoe in proper position in relation to the periphery of the wheel.
6. The brake release feature pulls brake shoes away from wheel contact instantly when brakes are released.
7. Prevents unnecessary wheel and shoe wear caused by dragging brake shoes.
8. GRIPCO supports can be removed and reapplied without removing nuts; therefore nuts are furnished in proper position.
9. Brake beams, rods, and levers are held in position under spring tension thus reducing false movements, chattering and wear of hangers, hanger pins and brake heads.
10. Can replace as a billable repair any support except A.A.R. recommended practice (angle-riveted and welded).

A.A.R. APPROVED—PATENTED AND PATENTS PENDING

OTHER GRIP NUT PRODUCTS AD NO. 110

Grip Lock Nut #1 Grip Holding Nut #2 Railroad Gripco Lock Nut #3

GRIP NUT COMPANY

Serving American Railroads Since 1904

106 BROAD ST., • SOUTH WHITLEY, IND.

ADVERTISERS IN THIS ISSUE

Air Maze Corp. 45
Albertson & Co., Inc. 67
American Brake Shoe Co.,
Railroad Products Div. ..... Inside Back Cover

Baldwin-Lima-Hamilton Corporation,
Eddystone Division 65
Baldwin-Lima-Hamilton Corporation,
Hamilton Division 49

Cincinnati Milling Machine Co., The 20
Columbia-Geneva Steel Division,
U. S. Steel Corp. 47

Demp-Nock Company 64
Douglas Fir Plywood Association 10, 11

Electro-Motive Division,
General Motors Corporation 12, 13
Esso Standard Oil Co. 4
Ex-Cell-O Corporation 52

Gardner-Denver Company 58
General Steel Castings Company 19
Grip Nut Company 68

Huck Manufacturing Company 59

International Nickel Company 15

Journal Box Servicing Corporation 9
Joy Manufacturing Company 33

Lewis Bolt & Nut Co. 66
Lix Corporation 54

Magnus Metal Corporation 16, 17
W. H. Miner, Inc. ..... Inside Front Cover

National Carbon Company,
Div. of Union Carbide Corp. 37
National Electric Coil Company 3
National Malleable & Steel Casting Co. 55

Pullman-Standard Car Mfg. Co. 61

Schundler & Co., Inc. F. E. 56
Standard Car Truck (Clevite Div) 63
Standard Car Truck Company 43
Standard Oil of California 31
Stratoflex, Inc. 60
Sturtevant, P. A. 62

Timken Roller Bearing Co. ..... Back Cover

Union Carbide Corporation,
National Carbon Company 37
United States Steel Corporation
(National Tube Div) 47
United States Steel Export Company,
U. S. Steel Corp. 47
United States Steel Supply Division,
United States Steel Corporation 47

Waukesha Motor Company 57
Western Railroad Supply Co. 64
Westinghouse Air Brake Company 40, 41
Wine Railway Appliance Co. 34, 35
Wix Corporation 51
Wyandotte Chemicals Corporation 6, 7

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Now "Roller Fre

the railroads $224

YOUR railroad can now save more money than ever by going "Roller Freight"—putting all freight cars on roller bearings. The chart below, based on a new 1958 study, shows that estimated savings in maintenance and operating costs will be $288,000,000 a year when all freight is "Roller Freight". That's 28% more savings than shown in 1955. It represents a return of about 24½% on the investment, or savings of $144 per car every year. "Roller Freight" is a big weapon to help you win the battle of rising costs.

While the cost of friction bearings and other things a

SAVINGS WHEN ALL FREIGHT IS "ROLLER FREIGHT"

1. Savings from eliminating the hot box problem	$ 2
2. Savings in terminal bearing inspection time	16
3. Savings in lubricant	
4. Savings in maintenance and replacement	1
5. Savings in periodic routine inspection	1
TOTAL SAVINGS	**$224**

SOURCES: *Timken Company Economic Study, statistics from A*

railroad uses have gone steadily upward, the cost of Timken® roller bearings has come down and down. Today, the extra cost of equipping a freight car with Timken roller bearings is about half what it was 10 years ago.

Now an amazing new kind of production line at Columbus, Ohio is capable of narrowing the price gap still more between friction bearings and Timken roller bearings. Using ultra-modern machines, it mass-produces Timken bearings for freight cars only. And it's geared to produce 20,000 car-sets a year—hold your bearing costs to an absolute minimum.

Your railroad can make the most of this new plant by getting together with the other railroads and ordering a specified number of Timken roller bearings every

"Roller Freight" is the next

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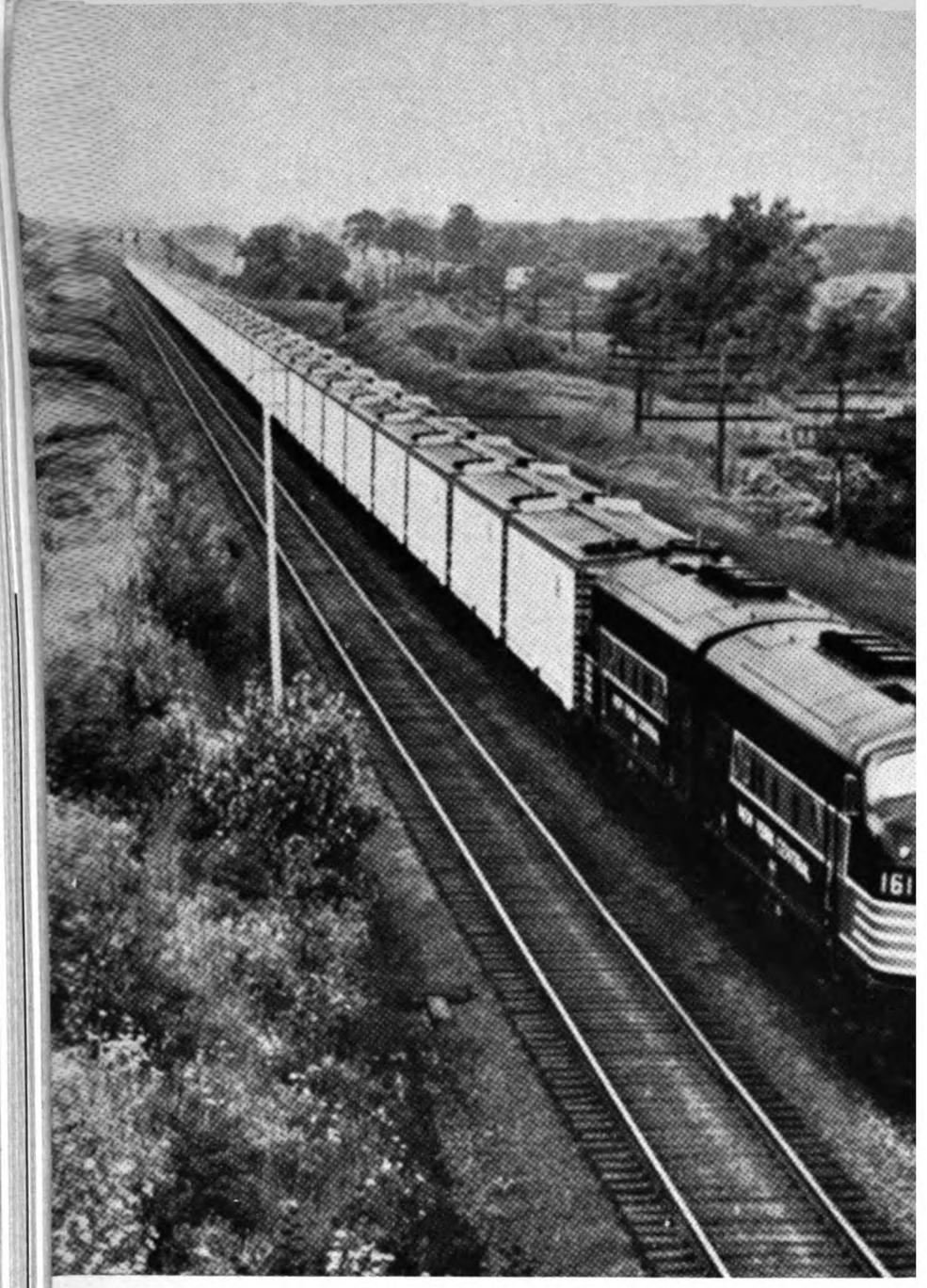

Maintain high eng

with Texaco 1693 I

The experience of leading railroads and the approval of all manufacturers of railroad diesels are behind Texaco 1693 Dieseltex HD-40. Here's why:

1693 Dieseltex keeps top decks and engine interiors clean. Its detergent and dispersive action prevents formation of harmful deposits. Rings and valves stay free for proper compression and full power. Its exceptional filterability for a dispersant type oil results in reduced ring, liner and bearing wear.

For more information about Texaco 1693 Dieseltex HD-40, and Texaco's Systematic Engineering Service, call the nearest Railway Sales Division office—there's one in

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and
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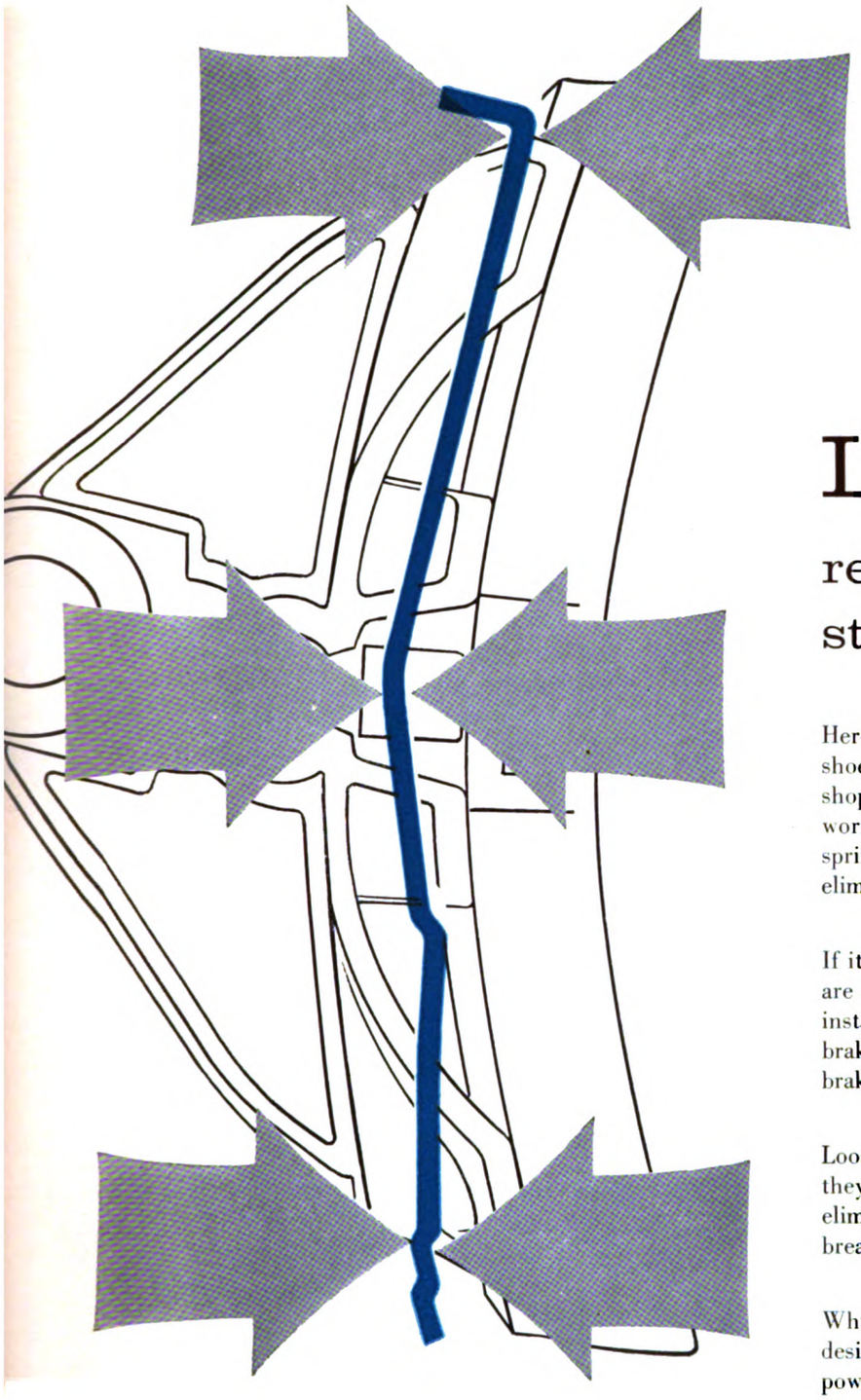
LUBRICATION IS A MAJOR FA

(PARTS, INVENTORY, PRODUCTION, D



Lockey

reduces shoe breakage
stops brake head wear

Here's a simple way to extend the life of your brake shoes, heads, and beams. When a car comes into the shop or the repair track, apply a Lockey in place of the worn standard key. The Lockey with its powerful spring action will firmly clamp the shoe to the head and eliminate destructive play between the parts.

If it makes good sense on new cars—the great majority are equipped with Lockeys—it makes good sense to install them on equipment in service. Lockeys will stop brake head wear and eliminate the need for replacing brake heads and beams.

Loose, worn keys not only cause brake head wear, but they also cause shattered brake shoes. The Lockey will eliminate this and pay for itself in reduced brake shoe breakage alone, within the first year!

Why? Because the Lockey is a *spring*—a specially designed spring, heat treated for long life and tremendous power. What's more, its installation is simple: a few raps of a hammer and it's there to stay. Remove with a few raps in the opposite direction and it can be used again.

A-447

AMERICAN **Brake Shoe** COMPANY

RAILROAD PRODUCTS DIVISION
530 Fifth Avenue, New York 36, N. Y.
In Canada: Dominion Brake Shoe Co., Ltd.

Now "Roller Freight" can save the railroads $224,000,000 a year

YOUR railroad can now save more money than ever by going "Roller Freight"—putting all freight cars on roller bearings. The chart below, based on a new 1958 study, shows that estimated savings in maintenance and operating costs will be $288,000,000 a year when all freight is "Roller Freight". That's 28% more savings than shown in 1955. It represents a return of about 24½% on the investment, or savings of $144 per car every year. "Roller Freight" is a big weapon to help you win the battle of rising costs.

While the cost of friction bearings and other things a railroad uses have gone steadily upward, the cost of Timken® roller bearings has come down and down. Today, the extra cost of equipping a freight car with Timken roller bearings is about half what it was 10 years ago.

Now an amazing new kind of production line at Columbus, Ohio is capable of narrowing the price gap still more between friction bearings and Timken roller bearings. Using ultra-modern machines, it mass-produces Timken bearings for freight cars only. And it's geared to produce 20,000 car-sets a year—hold your bearing costs to an absolute minimum.

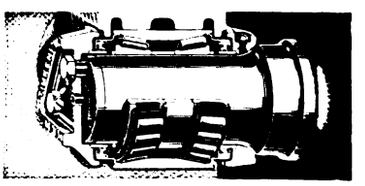
Your railroad can make the most of this new plant by getting together with the other railroads and ordering a specified number of Timken roller bearings every year. The result would be the kind of planned conversion that will keep your roller bearing costs at a minimum and help you establish more economical shop schedules.

Ask your maintenance and operating people what they think of "Roller Freight". One railroad's freight cars rolled over 300,000,000 car-miles with only one overheated bearing. On another line, Timken-bearing-equipped cars recently rolled 216,000 miles each without adding lubricant—the equivalent of over 12 years normal operation.

SAVINGS WHEN ALL FREIGHT IS "ROLLER FREIGHT"	1955	1958	ADDITIONAL SAVINGS
1. Savings from eliminating the hot box problem	$ 24,413,374.98	$ 45,502,194.42	$21,088,819.44
2. Savings in terminal bearing inspection time	164,699,060.22	191,692,293.75	26,993,233.53
3. Savings in lubricant	5,450,292.96	8,497,528.10	3,047,235.14
4. Savings in maintenance and replacement	15,718,042.49	24,902,006.29	9,183,963.80
5. Savings in periodic routine inspection	13,763,278.97	17,971,966.42	4,208,687.45
TOTAL SAVINGS	$224,044,049.62	$288,565,988.98	$64,521,939.36

SOURCES: *Timken Company Economic Study, statistics from AAR, ICC, University of Illinois and individual railroads.*

Start right now *planning* your "Roller Freight" modernization and new car program. Start switching to "Roller Freight" and take full advantage of your new roller bearing production line. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



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"Roller Freight" is the next great step in railroading

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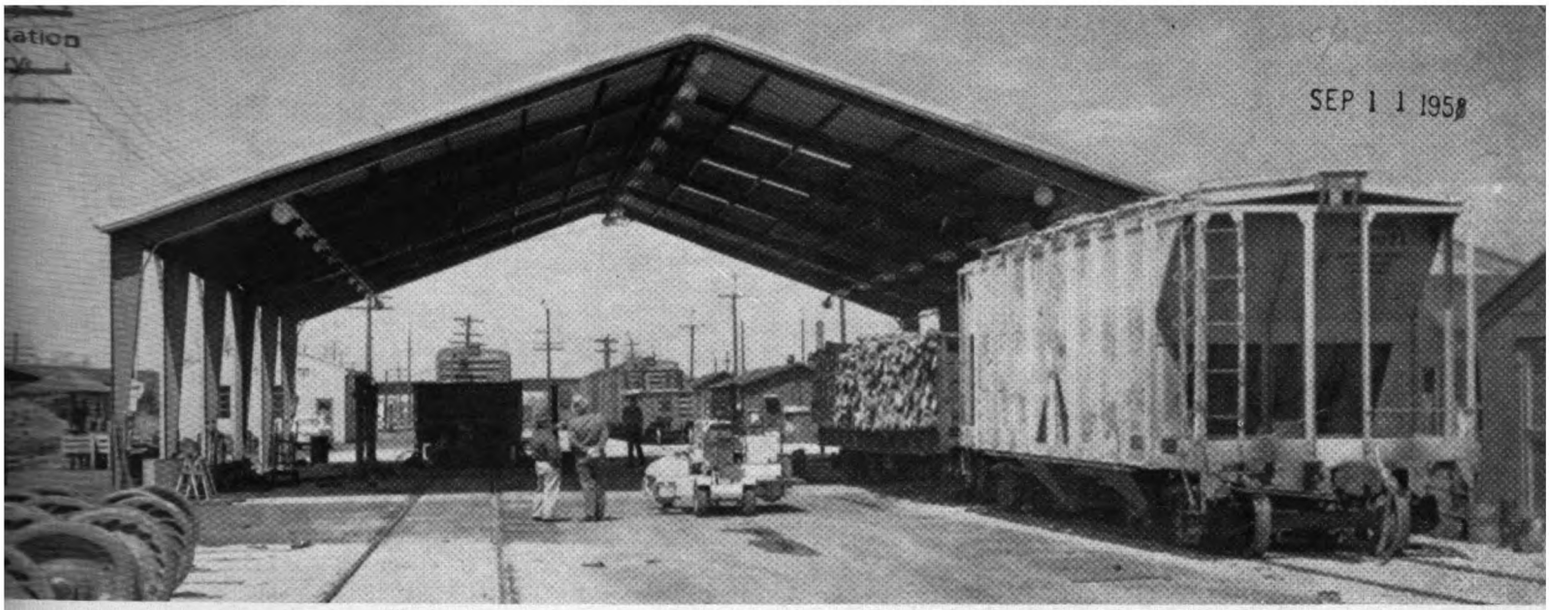

Central of Georgia 'Spot' Car Repairs . . . . . Page 31

ILWAY

LOCOMOTIVES AND CARS

A SIMMONS-BOARDMAN **TIME-SAVER** PUBLICATION **SEPTEMBER 1958**

Combustion Characteristics of 'Economy' Fuels . . . Page 38

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The experience of leading railroads and the approval of all manufacturers of railroad diesels are behind Texaco 1693 Dieseltex HD-40. Here's why:

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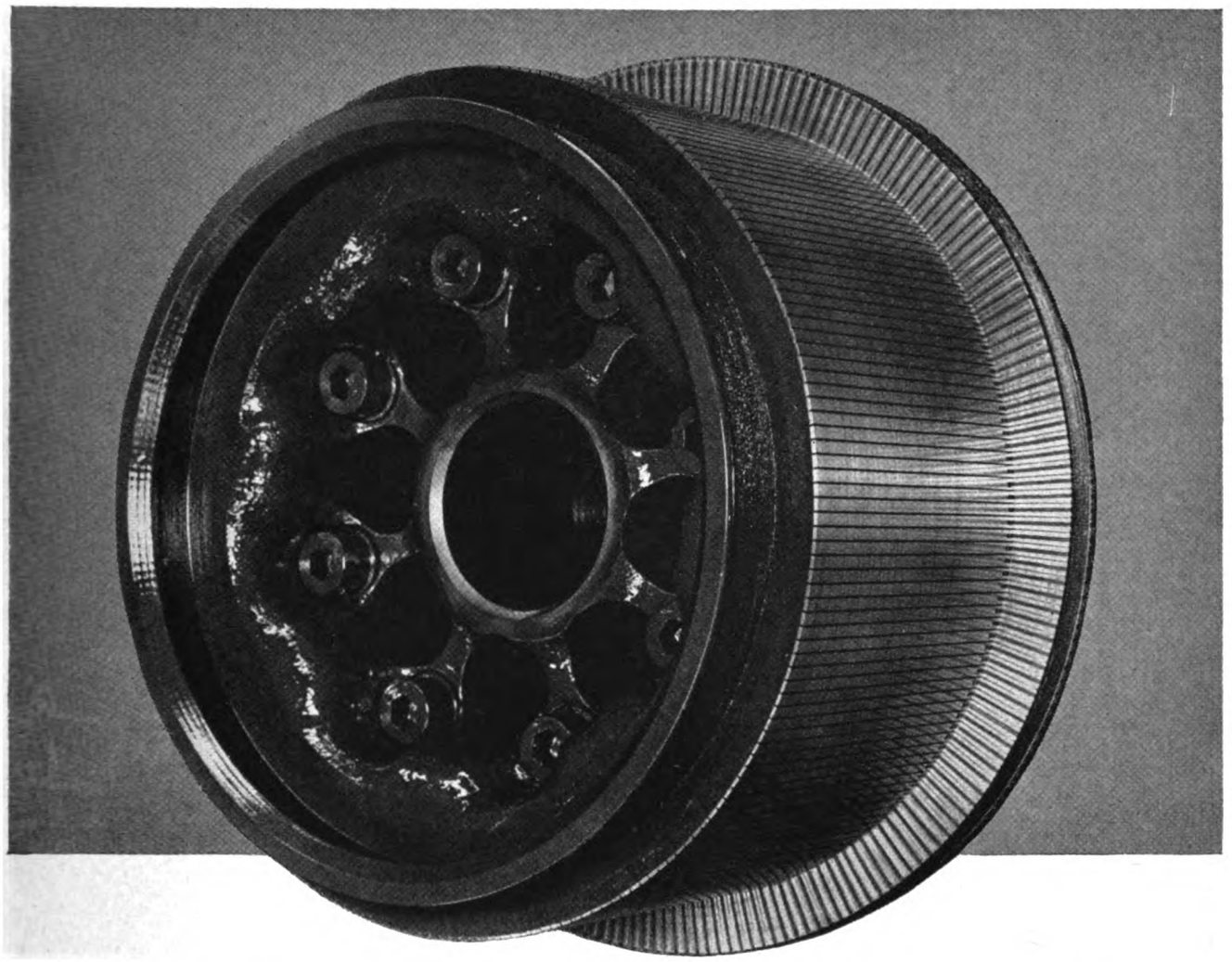

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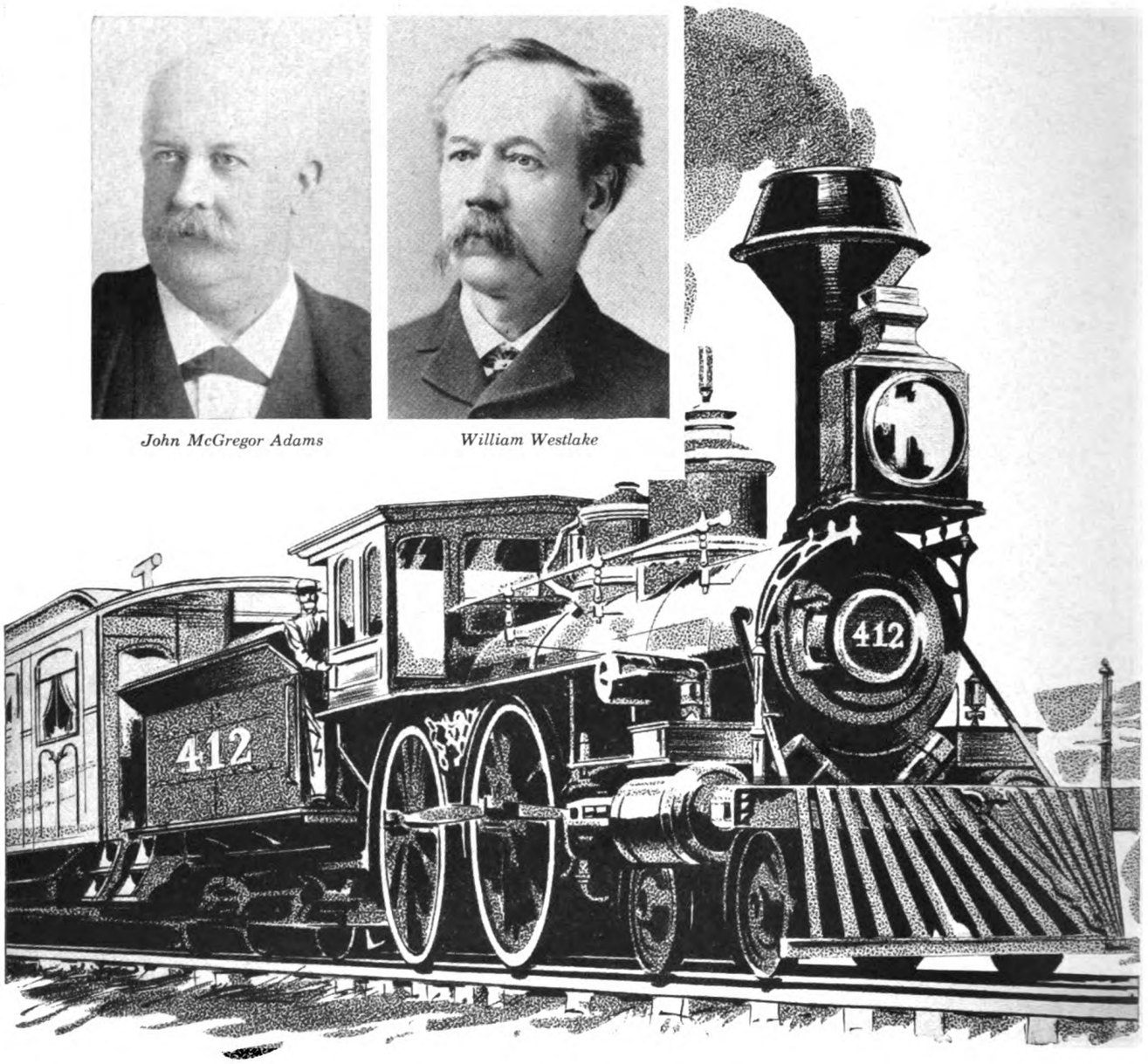
John McGregor Adams

William Westlake



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REPORT FOR SEPTEMBER

Second National Railroad Apprenticeship Conference

Management and labor delegates from 38 railroads at the second National Railroad Apprenticeship Conference in St. Louis, Mo., July 16-18, heard A. K. Atkinson, president of the Wabash, who was the keynote speaker. He reviewed the current railroad situation and, in speaking for the management of American railroads, welcomed the conference programs of the type planned. He said "It will offer another opportunity for management and labor to work together for their mutual good. There are so many different crafts and such a variety of jobs necessary in modern railroad operations that training on the job must be a continuous process. Any plan by which new employees can learn the right way to do the job expected of them is important to the railroad industry."

Clair M. Roddewig, president of the Association of Western Railways, had high praise for the industry's' skilled workers. He told the conference that "we'll need more than ever the skills you have, and the new skills you must teach to the next generation of railroad men as technology transforms us. In spite of recent sharp cuts in shop craft employment, the need for effective apprenticeship programs will be greater than ever before when the railroads are granted equality of treatment with their competitors."

Michael Fox, president of the Railway Employees Department, AFL-CIO, presented awards to a group of boys singled out as outstanding apprentices in the railroad shop crafts. Other speakers included Martin Grotjohan, supervisor of apprentice training and education, Locomotive and Car Equipment Department, General Electric Company, and R. W. Trimble of the U. S. Naval Training Center at Great Lakes, Ill.

The final session of the conference was devoted to an outline of Railroad Retirement Board operations as related to apprentices John Griner, administrative assistant to the labor member, RRB, and Thomas M. Healy, management member, RRB, handled the presentation. Eugene M. Hart, personnel manager of the Central of New Jersey, and George O'Brien, assistant president of the Brotherhood Railway Carmen, become chairman and co-chairman, respectively, for next year's convention, succeeding Harold M. Hoffmeister, general purchasing agent of the Missouri Pacific, and P. L. Shackelford, international representative of the Sheet Metal Workers International Association. The 1959 conference will be held at Omaha, Neb.

Special Committee Interprets Ex Parte 174

For several weeks a Special Committee of the AAR Mechanical Division has been engaged in reviewing questions pertaining to the intent of certain rules contained in the new and revised Locomotive Inspection Rules, as covered by Ex Parte No. 174, which are to become effective January 1. The report of the committee has now been submitted to the General Committee of the Mechanical Division and will be transmitted to Division 3 of the Interstate Commerce Commission.

The members of the Special Committee on Interpretations of Locomotive Inspection Rules are W. O. Teufel, assistant chief mechanical officer, Pennsylvania; W. C. Ward-

(*Continued on page 10*)

TIME SAVING IDEAS FOR SEPTEMBER

MOTIVE POWER AND CAR

Spot Repair Facility Will Pay for Itself in a Year 31
The Burlington Rolls Its Paint 34
Coordinated Associations Meet in Chicago 35
Combustion Characteristics of 'Economy' Fuels 38
B&O Installs Steel Box-Car Lining 44
Santa Fe Builds 88-ft TOFC Cars 48
'The Engine Stopped' (Mechanical Refrigeration Part 4) 53
SP Tests Extended Re-Lubrication 56
P&WV Tests Cobra Shoes in Road Service 72

ELECTRICAL

EMD Goes To All-Electric Control 60
Diesel Boosters for Electric Locomotives 65
Which Would You Prefer? (Diesel Maintainers Notebook) 68

DEPARTMENTS

Personal Mention 18
What's New in Equipment 20
Questions and Answers 72
Helps from Manufacturers 80
Supply Trade Notes 82

REPORT FOR SEPTEMBER—*Continued fr*

well, general mechanical superintendent—locomotive, New York Central; V. F. Leitz, regional maintenance supervisor, Baltimore & Ohio; M. B. Crowley, superintendent motive power, Great Northern; L. C. Shults, superintendent motive power, Southern; G. W. Meredith, assistant general master mechanic, Norfolk & Western; J. L. Hufham, general mechanical instructor, Atlantic Coast Line, and R. F. Dougherty, general electrical and air-conditioning inspector, Union Pacific.

Chicago Transit Board Announces Rapid Transit Research Program

Organization of a $250,000 co-operative research and development program to step-up progress of the high-speed era in urban transportation was announced recently by the Chicago Transit Board. Objectives of the program are the development and testing of lightweight rapid transit trucks, gear drives, axles and auxiliary braking specially designed for high-performance operation of lightweight, all metal rapid transit cars in the rights-of-way of multi-lane, grade-separated expressways. Speeds upward to 75 mph, a longer period of acceleration at the rate of 3½-mph per sec and enhanced passenger comfort and safety are the results expected.

CTA's associates in this venture are the Transit Research Corporation; Westinghouse Electric Corporation; General Electric Company; Budd Company; General Steel Castings Corporation; St. Louis Car Company; Dana Corporation; Westinghouse Air Brake Company; American Steel Foundries; Timken Roller Bearing Company and SKF Industries. Five of the 100 rapid transit cars now being built for the CTA by the St. Louis Car Company are to be equipped with the products of this program. These five cars, each a single unit, double end car,

(*Continued on page 18*)

Orders and Inquiries Placed Since the Closing of the Diesel-Electric Locomotive

Road and builder	*No. of units*
CANADIAN NATIONAL:	
Montreal Loco. Wks.	32
	4
	23
General Motors Diesel	16
	69
NORFOLK & WESTERN:	
Electro-Motive	192
Alco	40
	36

Freight-Car Orders

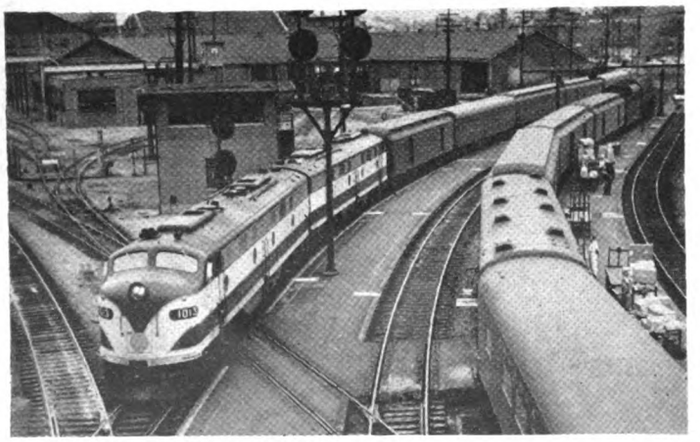
Road and builder	*No. of cars*
ATCHISON, TOPEKA & SANTA FE:	
Company shops	25
CANADIAN NATIONAL:	
Eastern Car Div., Dominion Steel & Coal	435
National Steel Car	60
CHICAGO, BURLINGTON & QUINCY:	
Company shops	100
NORTH AMERICAN:	
Pullman-Standard	20
	15
UNION TANK CAR:	
Company shops	30

Passenger-Car Orders

Road and builder	*No. of cars*
UNION PACIFIC:	
St. Louis Car	15
	10
	5

Inquiries and Notes

Trailer Train Company in market for 400 85 rather than usual center sill; roller bearings; ru securing trailers to car. 85-ft car expected to



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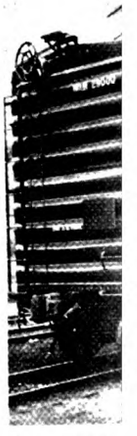
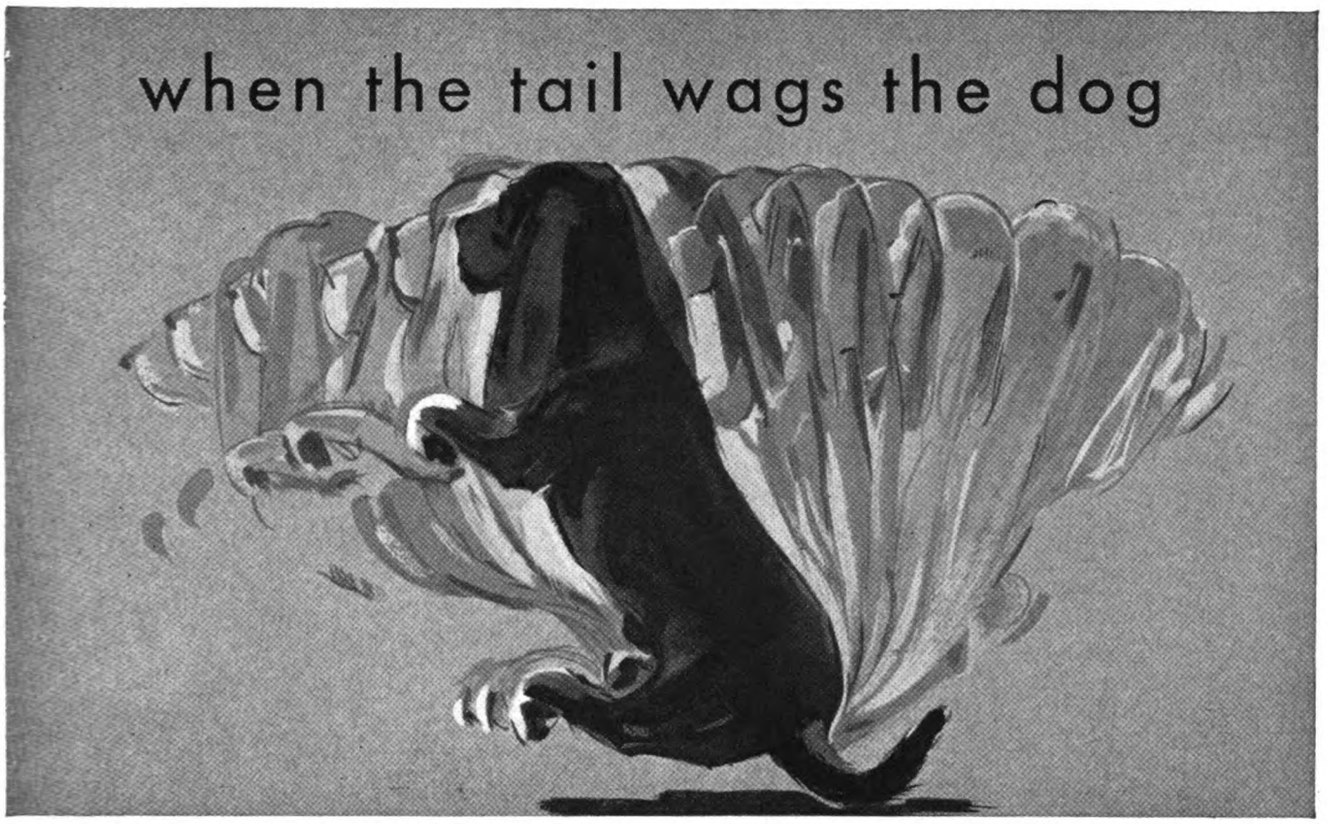


First of 1,000 side the cars h total opening. the floor, and 5 in. inside, ha have a capacit Transportation hoppers at sam

THERE'S SOMETHING RADICALLY WRONG



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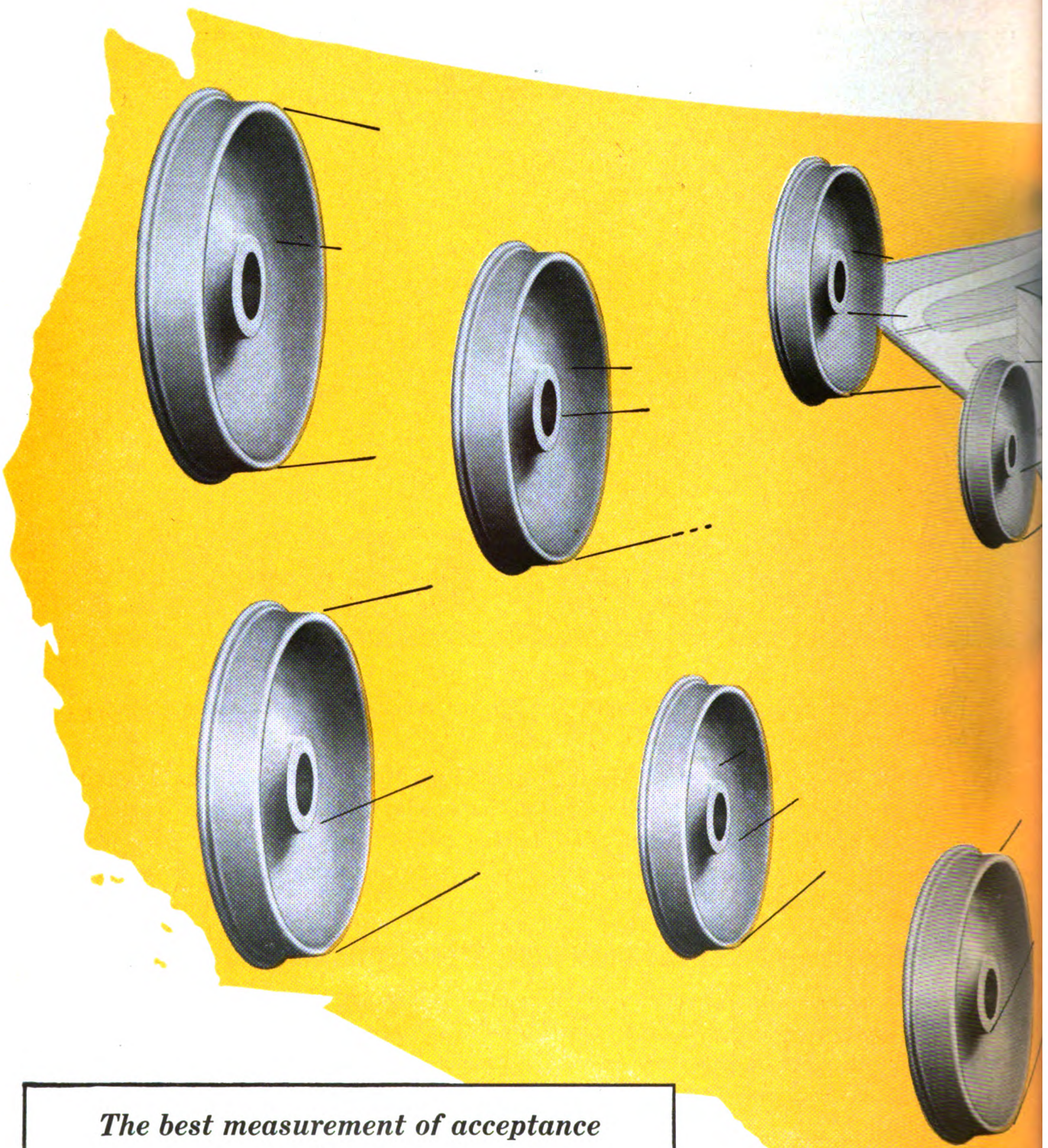

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1953	*1958*
One thousand Griffin EQS Steel Test Wheels put into service.	Griffin EQS Steel Wheels an AAR standard . . . with over 500,000 in service!

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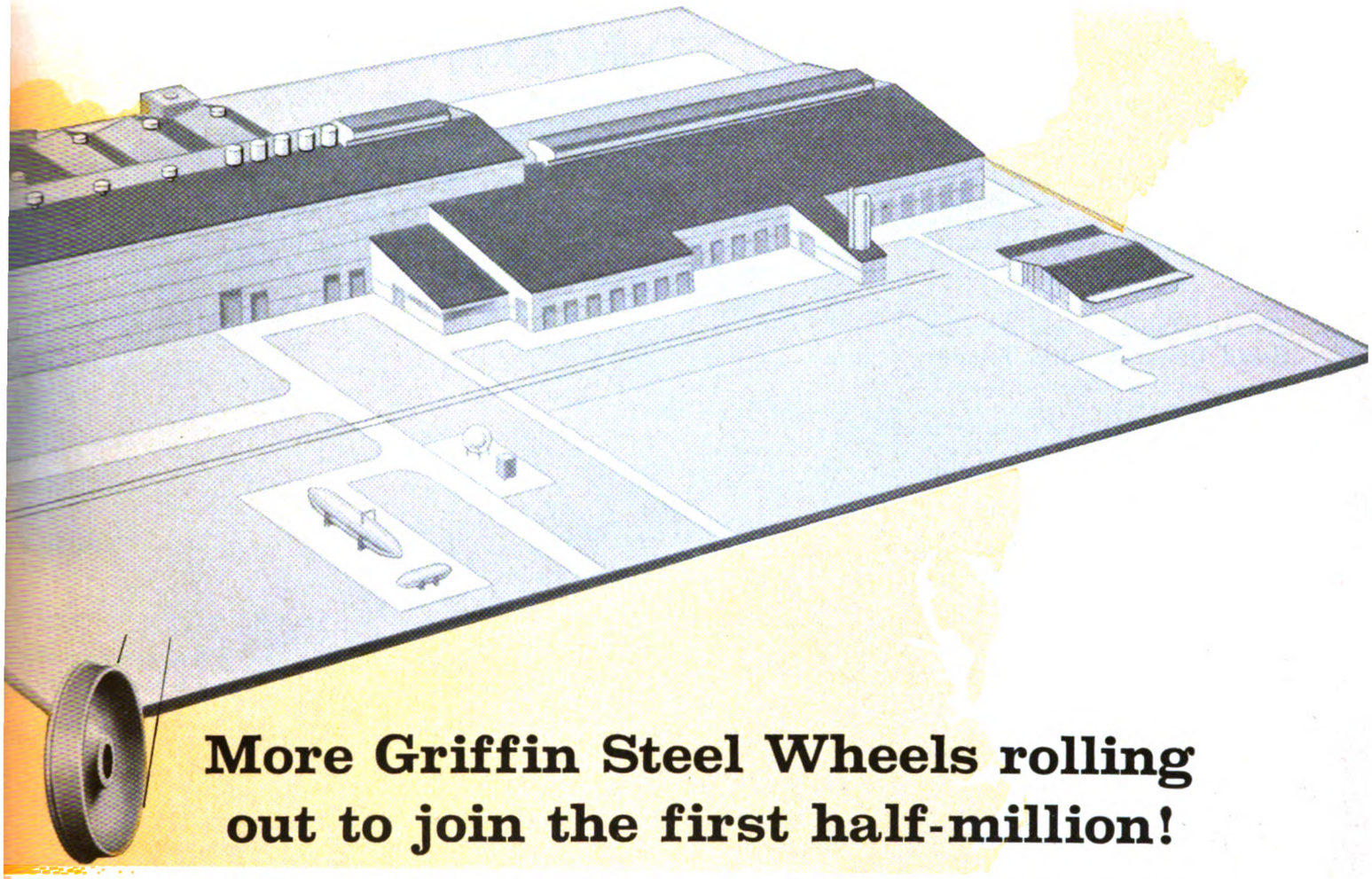

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Here's the newest chapter in the story of fifty million freight car wheels produced by Griffin since 1877.

A brand new ultra-modern plant—just put into production in Kansas City—is helping to add more Griffin EQS Steel Wheels per day to the over 500,000 now in use. All railroads and private car lines from coast to coast can now expect better service through strategic plant location.

Service of the first half-million has demonstrated the cost-cutting qualities of Griffin Steel Wheels: longer service life . . . better wear . . . greater uniformity . . . closer tolerances . . . a complete wheel inventory with fewer tape sizes and full interchangeability.

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REPORT FOR SEPTEMBER—*Continued from page 5*

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(*Continued on page 18*)

Orders and Inquiries for New Equipment

Placed Since the Closing of the August Issue

Diesel-Electric Locomotive Orders

Road and builder	*No. of units*	*Horse-power*	*Service*	*Other detail*
CANADIAN NATIONAL:				
Montreal Loco. Wks.	32	1,800	Passenger	Deliveries of these 144 units to begin in October and completed by August 1959.
	4	1,400	Road switch.	
	23	1,000	Yard switch.	General Motors Diesel will also build 30 steam generator units.
General Motors Diesel	16	1,200	Road switch.	
	69	1,750	Road switch.	
NORFOLK & WESTERN:				
Electro-Motive	192	1,750	—	GP-9's. 16 for passenger service. Beginning October 12 units a month to be delivered.
Alco	40	1,000	Switch.	T-6's.
	36	1,800	Road switch.	RS-11's. Beginning October, 4 units a month to be delivered.

Freight-Car Orders

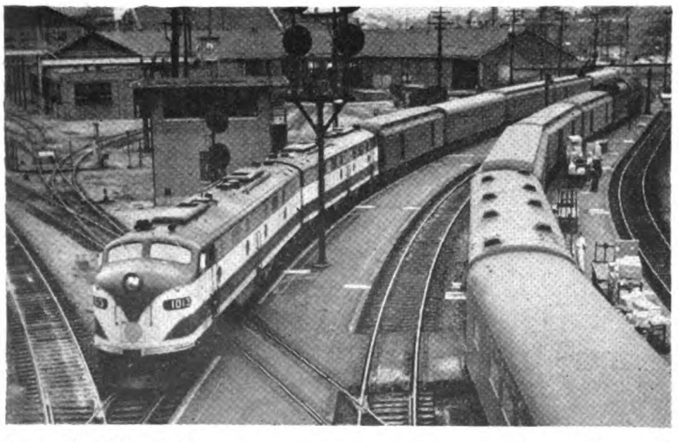
Road and builder	*No. of cars*	*Type of car*	*Cap, tons*	*Other detail*
ATCHISON, TOPEKA & SANTA FE:				
Company shops	25	Flat	—	88-ft for piggy-back service. To be 9 ft 6 in. wide. To have been completed last month.
CANADIAN NATIONAL:				
Eastern Car Div., Dominion Steel & Coal	435	Hopper	70	Delivery expected to begin late this year.
National Steel Car	60	Air dump	—	—
CHICAGO, BURLINGTON & QUINCY:				
Company shops	100	Box	50	To be built next year. Cost, approximately $1.26 million.
NORTH AMERICAN:				
Pullman-Standard	20	Hopper	—	2,003 cu ft cap. Cost, approx. $9,300 each.
	15	Hopper	—	2,893 cu ft cap. Cost, approx. $11,000 each.
UNION TANK CAR:				
Company shops	30	Tank	—	Class 111A. To be delivered last quarter 1958 and first quarter 1959.

Passenger-Car Orders

Road and builder	*No. of cars*	*Type of car*	*Other detail*
UNION PACIFIC:			
St. Louis Car	15	44-seat coaches	30 cars for delivery middle 1959.
	10	Lunch-counter, cafe lounge	
	5	Postal storage mail	

Inquiries and Notes

Trailer Train Company in market for 400 85-ft flat cars for piggyback service. To have grid type underframes rather than usual center sill; roller bearings; rubber-cushioned draft gears, and built-in semi-automatic devices for securing trailers to car. 85-ft car expected to be 10 per cent lighter than company's 75-ft car.



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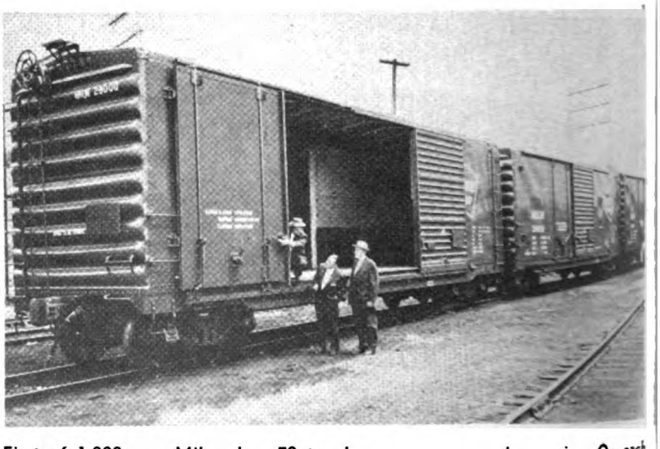
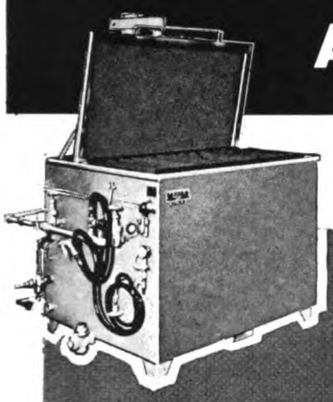


First of 1,000 new Milwaukee 50-ton box cars are now in service. On each side the cars have a plug and a conventional sliding door producing a 15-ft total opening. The cars have a NSF steel floor, steel lining for 3 ft above the floor, and ¾-in. plywood above the steel lining. The cars are 50 ft. 5 in. inside, have an inside width of 9 ft 4 in., are 10 ft 6 in. high inside, and have a capacity of 3,966 cu ft. Pullman-Standard and General American Transportation are each building 500 cars. Milwaukee ordered 100 covered hoppers at same time.

AUTOMATIC FILTER CLEANING



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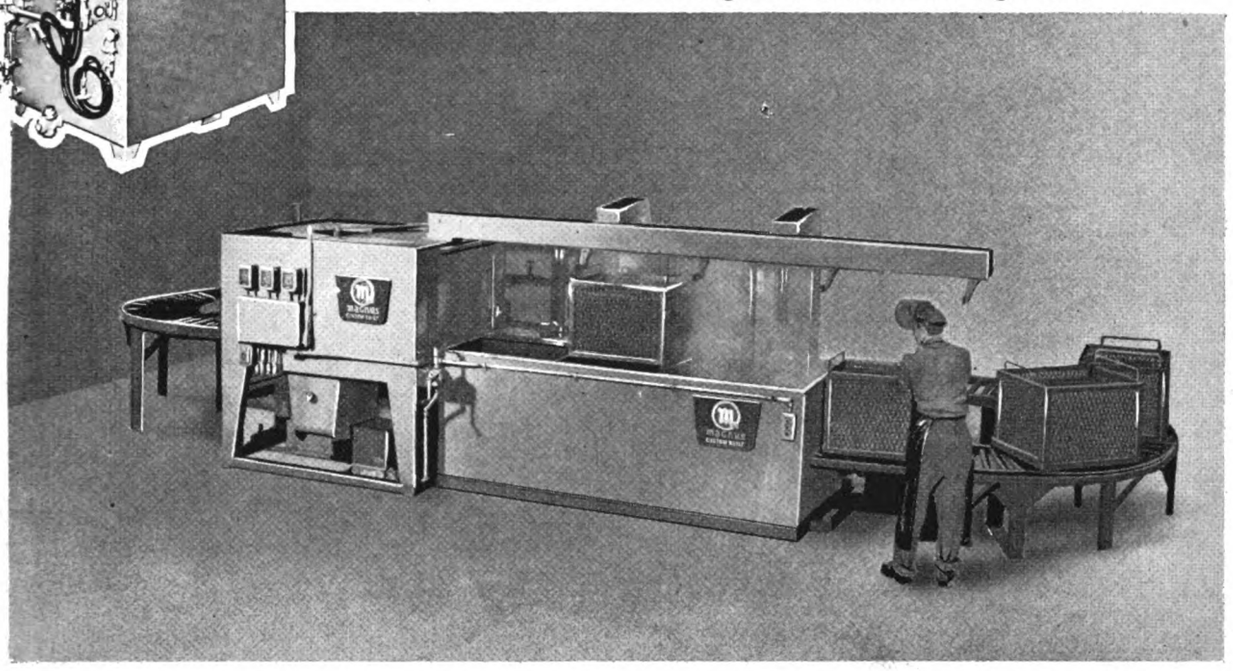

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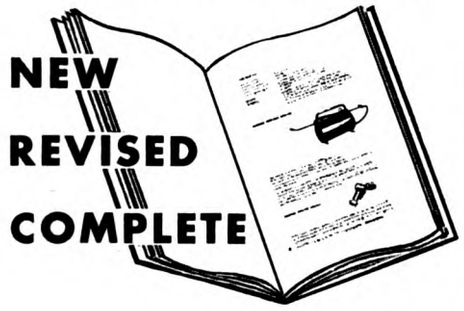

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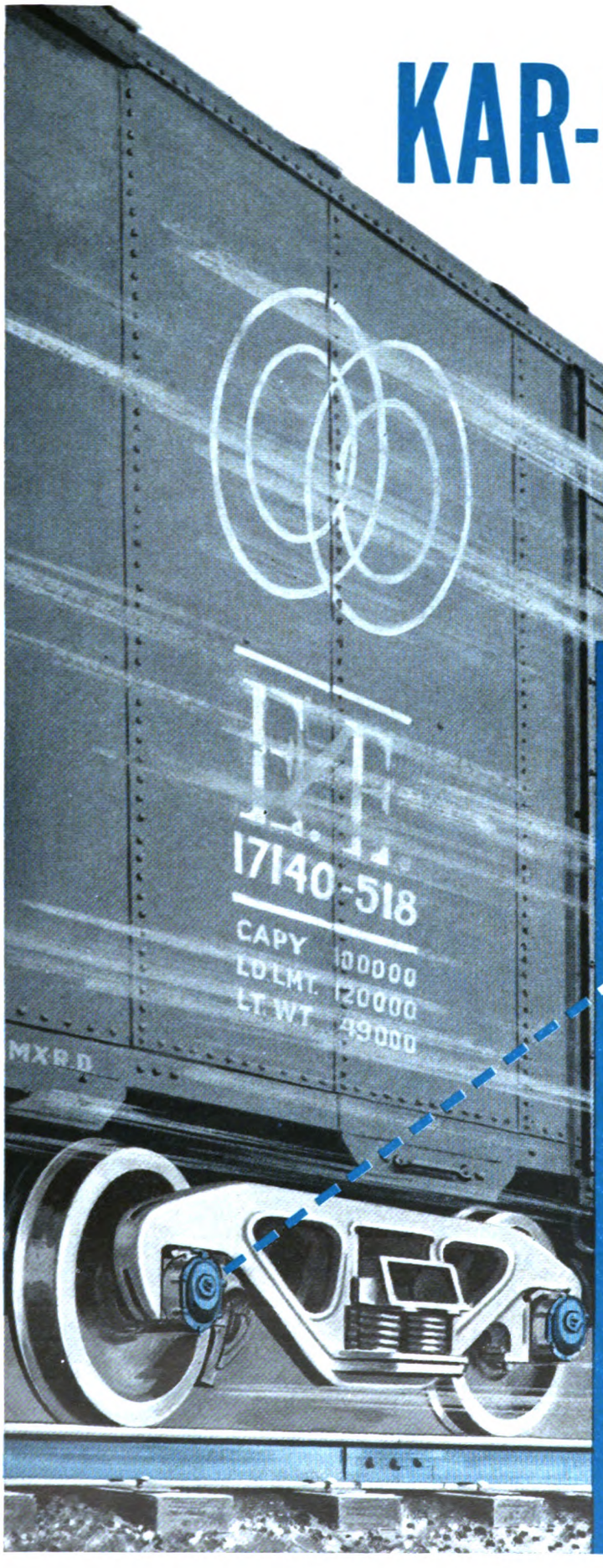

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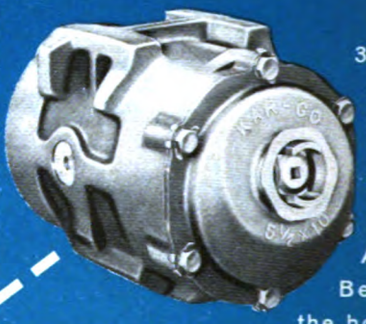

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Offers railroads a low-cost solution to the hot-box problem.

d hot boxes at rock-bottom price

YOUR RAILROAD is running longer trains on faster schedules—heavier duty on the equipment. Why take a chance that a hot box will disrupt schedules, disappoint customers and increase costs?

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Millions of in-service railway miles and three years of rugged field testing prove the worth of KAR-GO Cartridge Bearings. This full-round sleeve bearing provides rugged low-cost features together with the advantages of sealed-in, low maintenance units in a way that no "gadgetized" journal brass can approach.

An Allison KAR-GO Bearing will actually pay for itself in two years by reducing routine maintenance and service failure cost. Subsequently additional KAR-GO Bearings can be added to your new car fleet from savings in hot-box elimination alone.

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Allison KAR-GO

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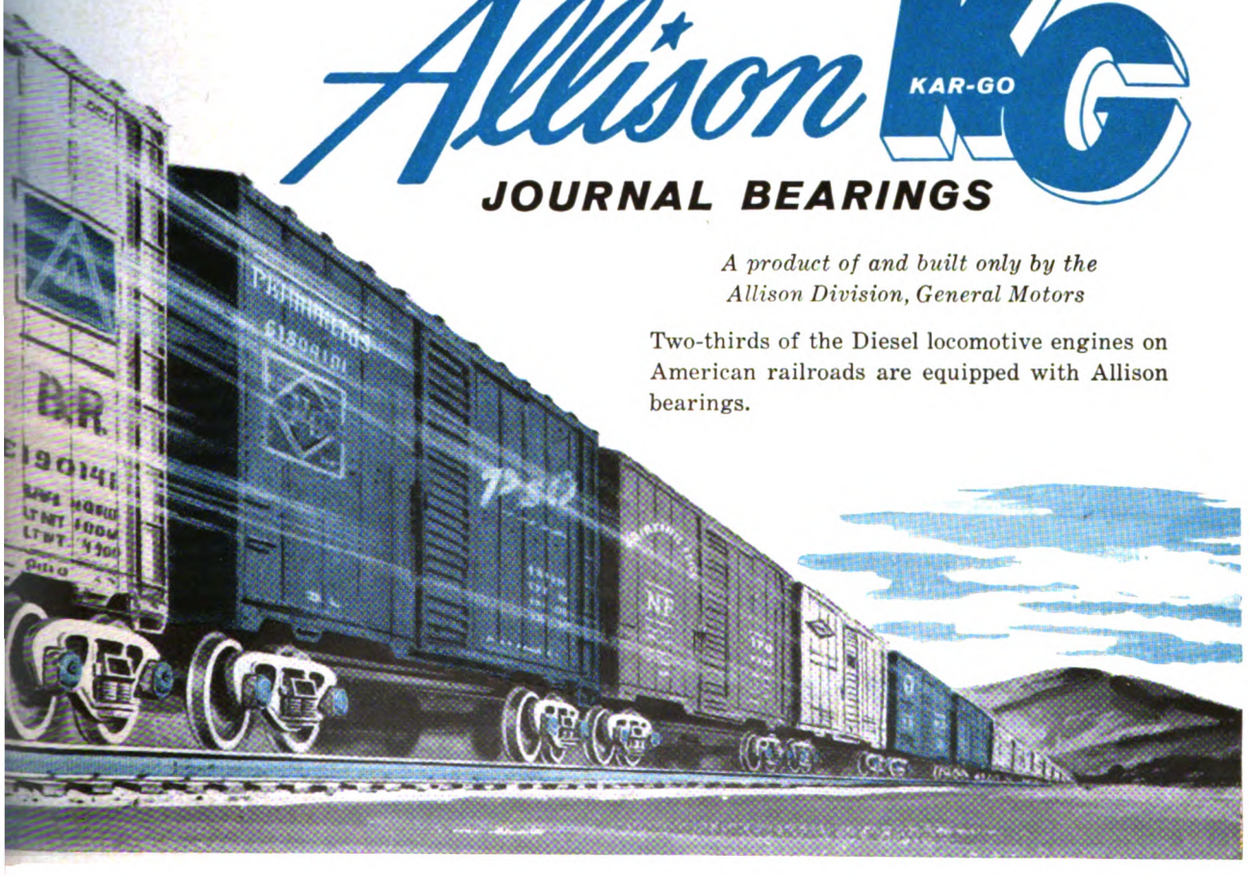
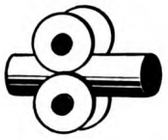
A product of and built only by the Allison Division, General Motors

Two-thirds of the Diesel locomotive engines on American railroads are equipped with Allison bearings.



The Bethlehem wheel you buy today is a *proven* wheel —a type that years ago graduated from the development stage. It's made of steel that is first cast into ingots, then "worked" in a series of steps that add strength and long life. The first of these steps takes place when the ingots are rolled  into blooms. After the blooms have been sliced, the rounds are forged, then processed in a vertical rolling mill. Wheels produced by this method are *wrought-steel* wheels, and Bethlehem has sold millions of them during the past 30 years. Conforming strictly to AAR standards, they are your best buy for freight, passenger, and diesel-locomotive service. You can install them with confidence.

BETHLEHEM WROUGHT-STEEL WHEELS

COMPANIONS TO BETHLEHEM FORGED-STEEL AXLES

FREIGHT • PASSENGER • DIESEL

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

New SPERRY REFLECTOSCOPE cuts time and cost on axle testing

Designed specifically for railroad use, the Type US Sperry Reflectoscope offers a faster, simpler, more accurate and more economical means of testing. Axles can be tested "in place" on locomotives or cars, resulting in major maintenance economies by detecting hidden flaws before they cause costly failures or breakdowns.

The Sperry Reflectoscope offers these advantages:

Complete portability... weighs only 35 pounds

Low power consumption... built-in voltage regulation

Simplified four-knob control panel

New, completely transistorized plug-in alarm system... eliminates possibility of human error

Bright . . . easy to read video presentation

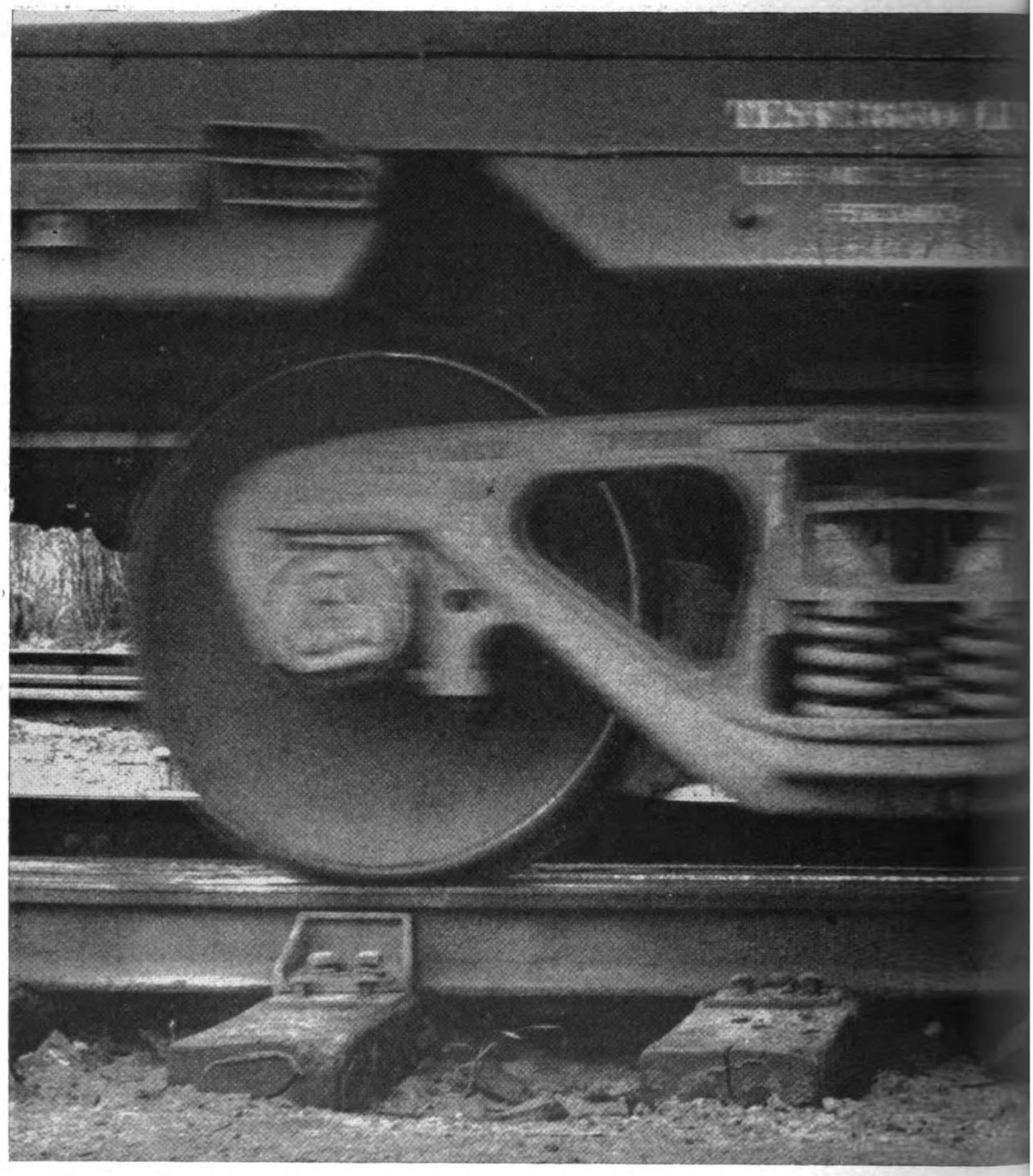
Sperry Reflectoscope Type US is another fine example of Sperry Rail Service's "engineering exclusively for railroads." If you're interested in cutting maintenance costs and achieving maximum equipment utilization, send for details of this outstanding inspection tool.

RAIL Sperry SERVICE

SPERRY RAIL SERVICE

SUPPLYING RAILROADS EXCLUSIVELY

Division of Sperry Products, Inc. • Danbury, Connecticut



Where payloads roll on roller bearings . . . Gulf makes things run bet

NEW GULFCROWN R.R

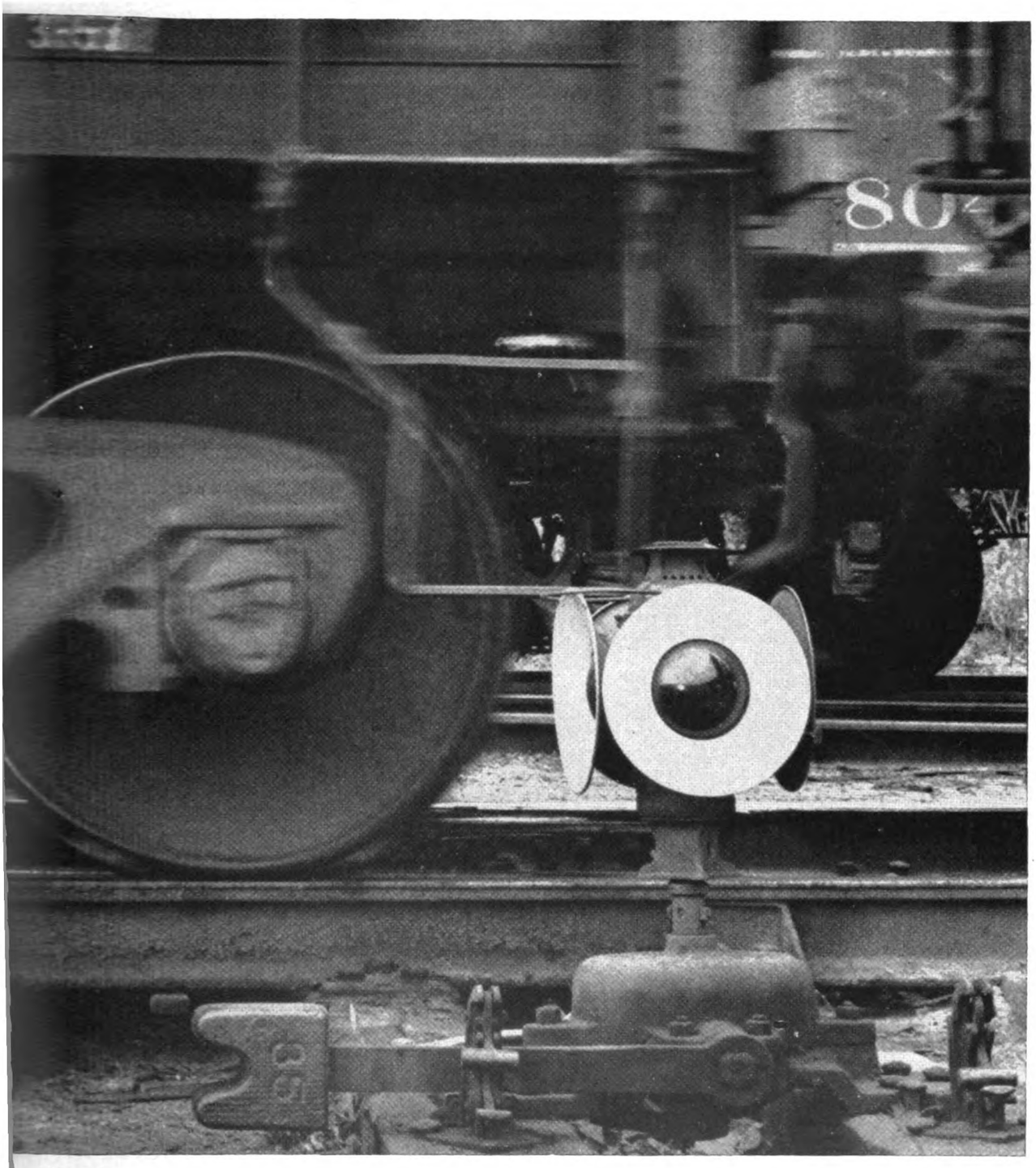
New Gulfcrown R.R. is a lithium base grease especially developed to provide better lubrication for railroad car roller bearing journals. It has been tested and approved against A.A.R. Specification No. M-917-56.

Stands up at high temperatures. New Gulfcrown R.R. has been used successfully in bearings operating at temperatures as high as 250° F.

Pumps freely at low temperatures. Gulfcrown R.R. Grease doesn't become hard, or unworkable, even wh subjected to temperatures as low as 0° F.

Won't thin out at high speeds. Its excellent mechanic stability keeps Gulfcrown R.R. from thinning out und the churning action of high speed bearings.

Resists washing action of water. Won't wash aw even under wettest conditions. Gulfcrown R. R. al provides protection against rust.



REASE

llent oxidation stability. New Gulfcrown R. R. ase is effectively inhibited against oxidation to insure g life, both in storage and in use.

fcrown R.R. Grease is available now, in 35 lb. pails, lb. drums and 400 lb. drums. Let us prove that you get more effective roller bearing protection—and uced maintenance costs—with this outstanding new ase. Write or phone.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

GULF

REPORT FOR SEPTEMBER—Contin

will be test-operated as a train in the West Side subway service, beginning next spring or summer.

The St. Louis Car Company, using TRC designs, will build three car-sets of trucks. One set will be equipped with GE 100 hp motors, axles and gears, a conventional propeller shaft, TRC's conventional center bearing support for the car body and a combination of coil steel and rubber springs. GE control equipment will be installed. The second set of trucks will have Westinghouse 100 hp motors, and the Dana Corporation close-coupled gear drive unit which eliminates the propeller shaft. The body will be supported by center plates with side bearings, and springs will be a combination of coiled steel and rubber. The third set of trucks will have Westinghouse 100 hp motors, a Dana Corporation drive unit having a torque tube instead of a propeller shaft, center bearing car body support, and flat leaf springs. Westinghouse controls will be used with the motors for these two car-sets of trucks.

GSC will build one car-set of trucks to its own specifications. This set will be equipped with GE 100 hp motors and gear units, conventional propeller shaft, center bearing support for the car body and a combination of coiled steel and rubber springs. Control equipment will be supplied by GE. The Budd Company will build one car-set of trucks to its own specifications and equip them with Westinghouse 100 hp motors and the close-coupled gear drive unit. The body will be supported on a combination of center and side bearings and will rest on air springs. Control equipment will be supplied by Westinghouse. Gear and axle unit bearings will be Timken and SKF for all five car-sets of trucks.

The 100 hp motors and controls to be used were recently develo operative arrangement CT inghouse and General Elec

Summary of Monthly Hot Box Reports

Month	Cars set off between terminals with hot boxes: System	Cars set off between terminals with hot boxes: Foreign	Miles per car set off
May 1953	5,892	11,433	173,945
May 1954	4,416	6,510	248,353
May 1955	4,852	8,672	216,788
1956			
May	4,672	10,903	196,688
June	6,777	15,125	135,774
July	8,484	16,067	113,573
August	9,891	16,892	113,474
September	6,834	12,629	149,970
October	4,357	8,429	243,505
November	2,650	5,560	359,759
December	2,256	4,436	438,425
1957			
January	3,373	6,121	291,453
February	3,272	6,844	264,538
March	3,164	6,687	307,306
April	3,949	8,447	228,493
May	6,580	12,691	154,387
June	8,285	16,277	115,749
July	10,438	18,819	96,064
August	9,662	17,639	109,839
September	6,736	12,066	157,694
October	4,616	8,050	233,004
November	2,839	4,762	370,693
December	2,833	3,486	462,475
1958			
January	2,037	3,190	495,080
February	2,302	3,901	377,613
March	2,846	4,688	354,454
April	3,633	5,662	264,093
May	6,065	8,718	178,975

C&O-N&W-PRR Star Hoppers Under Con

Three sample, standardizec cars, which promise savings costs and maintenance, are b shops of the Chesapeake & (Western and Pennsylvania. T approximately 165,000—31 p hopper cars in the US.

The new design represent efforts and studies of the thr has been presented to the enti to car builders as an approac design for a standard hopper

Personal Menti

Atlantic Coast Line.—*Waycross,* CREASY, JR., appointed foreman department; L. A. MCLEAN, department, repair tracks, secon H. W. BLOUNT, foreman, car train yard. Savannah, Ga.: W. appointed foreman. Formerly Emerson shops.

Canadian National.—*Montreal:* HURLEY appointed chief of technic A. T. G. WESTBROOK, assistant c tests, appointed controller of tes terials research, succeeding Mr. H

Chicago & North Western.—*St. Pa* J. E. BREHM appointed master *Huron, S.D.*: C. D. HILL appoint mechanic. *Clinton, Iowa*: H. K. Cox master mechanic.

Chicago, Rock Island & Pacific.—*Chic* H. LLOYD appointed general superint motive power to succeed M. R. retired. Mr. Lloyd formerly general of the Alaska.

Illinois Central.—*Chicago:* JOHN L. mechanical and research engineer, re

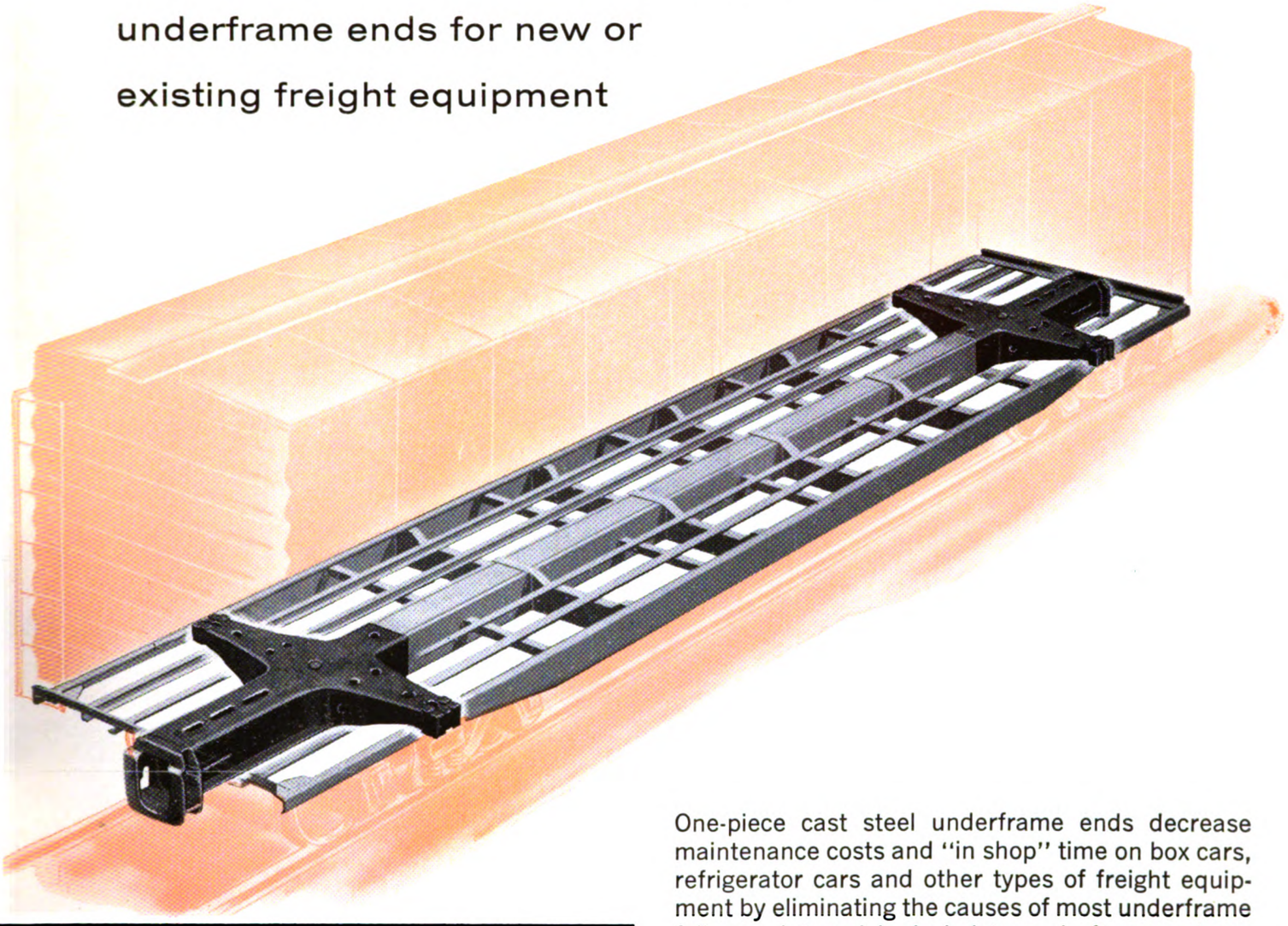
Long Island.—*Morris Park Shops,* R. P. TURNBULL appointed superinter shops. J. BRANNAN appointed master m

Missouri Pacific.—*Houston, Tex.*: E. G. road master mechanic, Kingsville a quincy divisions, and L. W. MARTIN, t master mechanic, Settegast Terminal exchanged positions.

New York Central.—*New York*: S. T. appointed chief mechanical officer. F position of chief mechanical superinte abolished. *Collinwood, Ohio.* R. F. B MAN, mechanical superintendent of the F appointed assistant superintendent diesel of the NYC at Collinwood. Former position abolished.

Where railroad progress is cast in steel....

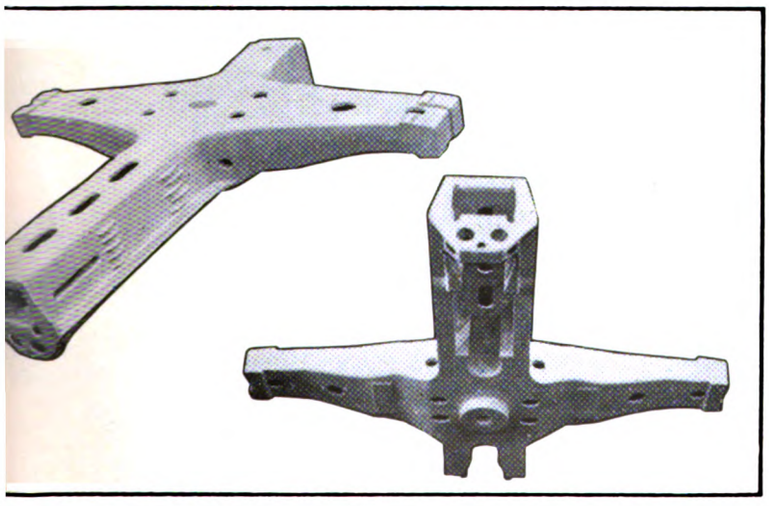
Today—more and more railroads order Commonwealth cast steel underframe ends for new or existing freight equipment



One-piece cast steel underframe ends decrease maintenance costs and "in shop" time on box cars, refrigerator cars and other types of freight equipment by eliminating the causes of most underframe failures. Integral body bolsters, draft gear stops, strikers, coupler carriers, center fillers, center plates and side bearing pads provide many advantages for new or rebuilt cars.

- eliminate body bolster failures
- increase car life
- simplify car building and repairing
- provide greater strength in critical areas
- resist rust and corrosion
- meet AAR code for interchange

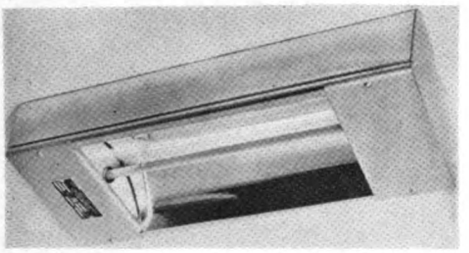
Here is a proved way to get longer freight car life with reduced upkeep costs—now in service on many progressive railroads.



The combining of many separate parts into a one-piece casting eliminates failures and repair problems in critical areas.

GENERAL STEEL CASTINGS

GEARED TO PROGRESS



Infra-Red Unit

The aluminum housing and reflector of the R-600 Infra-red Oven section has been designed to use a special quartz-enclosed nichrome heating element. This gasless heating tube emits radiation at a wavelength of 2.3 microns, said to be the length of wave most completely absorbed by water, solvents and many industrial materials, and therefore, most effective for heating, drying and baking. Unlike most other types of electric radiant heaters, this element produces very little visible radiation, eliminating glare and loss of energy.

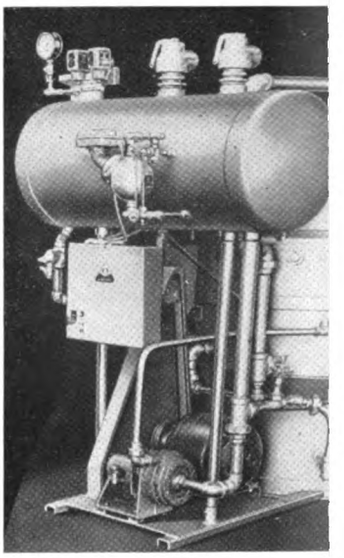
Both the quartz tube element and its housing can be furnished in any required length, to operate at any voltage and in a wide range of wattage ratings. The heating element is readily responsive to input controllers, making it particularly adaptable to cycling operations and automation. *Lighting Div., Safety Industries, Inc., Dept. RLC, P. O. Box 70, Milford, Conn.*

Arc Welding Machines

This Airco motor generator machine is designed for application of the gas-shielded metal-arc processes where equal burn-off rate and wire-feed must be maintained. Its rising volt-ampere curve reacts instantaneously to all wire-feed speed changes to maintain constant arc length. The current rating is 450 amp continuous; weight, 840 lb; height, 28¾ in.; width, 20⅝ in., and length, 34⅝ in.

Hornet motor generators, now available in 300 and 400-amp models, are designed for d-c metal-arc and inert-gas-shielded arc welding. Quick response and a well-controlled arc

enable vertical and overh
excessive spatter or special
trolled current peaks resul
speeds and stronger wel
range, complete phase insu
construction are features.
built for stacking one on to
Reduction Sales Company,
East 42nd st., New York 1



Steam Generators

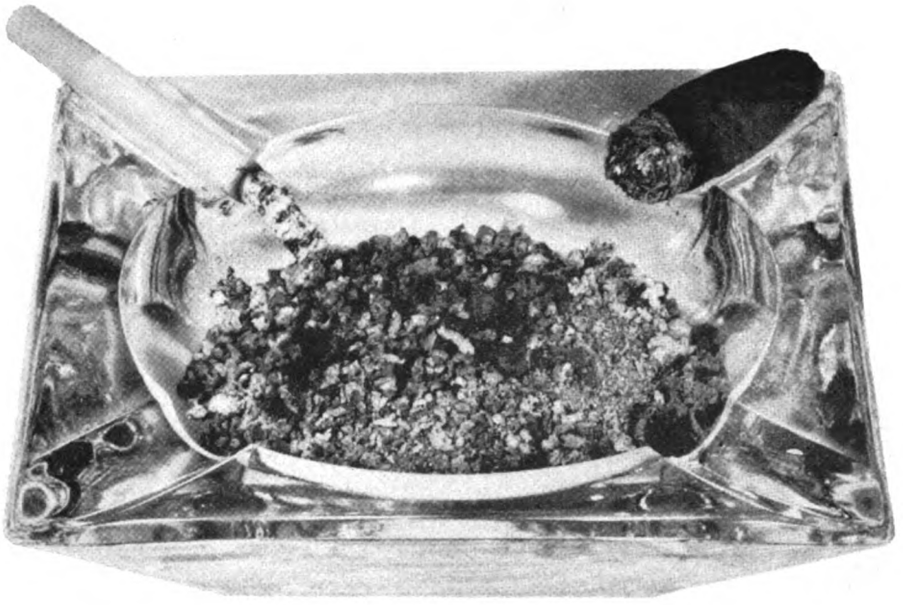
A complete series of water tub
known as the Vapor Drum Modu
have heating surfaces designed for
output in minimum space. The weig
that only 100 to 175 lb per sq ft o
is required. The units are complet
matic, explosion-proof, and require
ney—merely an outlet for gases.

The line ranges in sizes from 20 h
hp. Low pressure steam can be deli
0 to 15 psi, or high pressure steam
150 psi. The smaller units will burn
fuel oil or low pressure gas. The 100
larger models can burn No. 5 fuel oil
Vapor Heating Corp., Dept. RLC, 6
Howard st., Chicago 31.

Water Treating Resin

Nalcite HCR-W is a cation exchange
said to have greater physical stability
ever before attained in a cation excha
Bead breakage, which creates fines that
pressure drop build-up, is virtually eli
ated; so is the resin loss usually cause
broken beads.

Operating temperatures as high as 250
F do not affect stability or capacity. Na
HCR-W is particularly suitable for use in
lime zeolite water treating plants. In addi
it can be used in mixed bed demineraliz
National Aluminate Corp., Dept. RLC, 6
West 66th Place, Chicago 38.



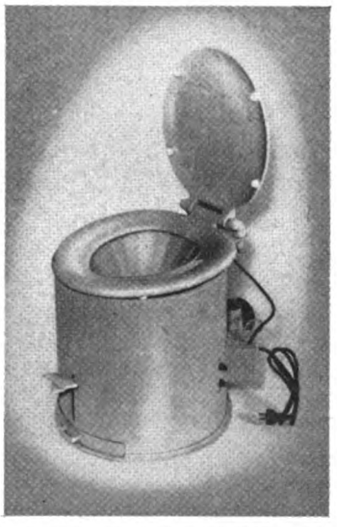
ELECTRIC-INCINERATING TOILET FOR RAILROAD USE NO MORE CARE THAN AN ASHTRAY!

The cigar and cigarette are real, but the ASH in the picture is from the ashpan of an INCINOLET—after two days of use.

INCINOLET is a waterless electric-incinerating toilet. INCINOLET works as a complete disposal plant, reducing all human waste to odorless, inorganic ASH – bacteria free.

INCINOLET eliminates waste disposal problems with scientific sanitation by electric incineration. It is the first sanitary toilet designed specifically to rid railroads of maintenance demands common to the chemical storage bucket and water closet. INCINOLET is perfectly adaptable for use on diesels, cabooses and work cars, and is easily and quickly installed by regular railroad maintenance men.

For complete details write Dr. E. Bayne Blankenship, president or . . . railroad representative: Ajax-Consolidated Company

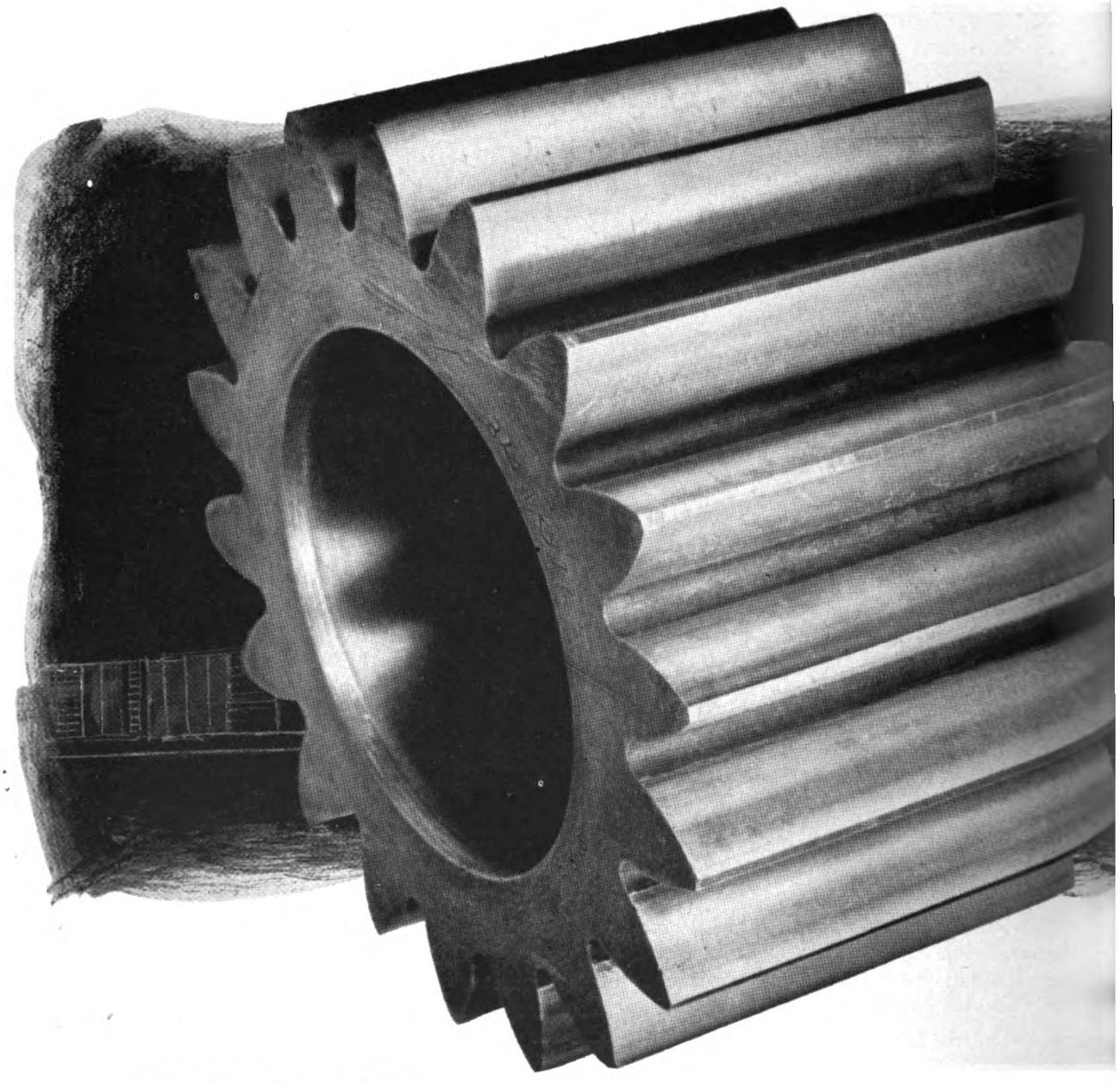


INCINOLET – waterless toilet

RPMC

RESEARCH PRODUCTS MANUFACTURING COMPANY P.O. BOX 35164 • DALLAS 35, TEXAS

Like New After



PROOF Unretouched photo shows typical traction motor pinion gear from Lehigh and Hudson River Railway Company locomotive after 8 years of service. Commenting on this, W. E. Burns, L and HR Mechanical Superintendent, says: "To date, all axle gears and traction motor pinion gears have shown very little wear. This proves to us the excellent lubricating properties of Sinclair Jet Lubricant TM."

3 Years Service

ICLAIR JET LUBRICANT TM CUTS COSTLY GEAR WEAR

lair Jet Lubricant TM is a rich, rugged Pennsylvania oil that cushions traction motor teeth, prevents undue wear and reduces excessive electrical loads. Now in use on over American railroads, it's unsurpassed for heavy-duty work in Diesel traction motor gears.

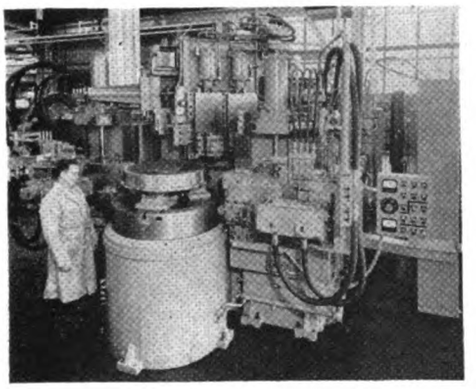
ilable in 1-lb and 2-lb Poly bags; also in 4-lb Poly bags for recharging at overhauls; in) pails; 120-lb and 400-lb drums.

additional information, contact Sinclair Refining Company, Railway Sales, 600 Fifth nue, New York 20, N. Y. • Chicago • St. Louis • Houston

INCLAIR RAILROAD LUBRICANTS

support the wood throughout the length of the floor plank. The system uses clips instead of permanent welds to hold the floor sections to the underframe of the car. Nelson studs secure the 2- x 4-in. wood strips.

The first installation of this flooring was made in conjunction with an installation of the Youngstown Steel Car "Safe Cargo" wall anchors (RL&C, June 1958, p. 18). *Republic Steel Corporation, Dept. RLC, Republic Building, Cleveland.*



Vertical Wheel Lathe

This tracer-controlled, high-speed, vertical lathe with mechanically-clamped, insert-type, carbide tools finish-turns car wheels from the rough cast or forged condition. The machine is designed to process wheels from 33 to 42-in. in diameter in a 2¼-min. machining cycle.

A 125-hp variable-speed drive provides the necessary adjustable 20 to 80-rpm table speeds. Hydraulic controls include six hydraulic pumps driven by one 15-hp and one 20-hp motor, a tracer system operated by a template-controlled servo valve with a mechanical follower, and hydraulic cylinders that operate a three-jaw chuck on the inside of the rim, and expanding arbor holddown in the axle hole on the work table.

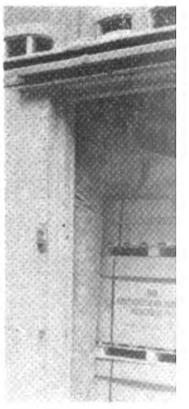
The work table is driven through a multiple V-belt drive, spiral bevel gears and helical gears. The tree compound slides carry tool blocks with minimum overhang. The compound slide above the work table carries two tool slides. One of the slides has two tools that rough and finish-face the hub. The other has three tools, two that rough and finish-face the rim and another that provides the rim radius.

The machine has provisions for quick-change settings for machining wheels to the next smaller tape should porosity or surface cleanup problems be encountered. Turning is performed dry at speeds of 250 ft per min. Turning and facing operations are performed at feed rates of .065-in. per revolution.

The 10-ft high machine occupies a floor space approximately 15 ft by 17 ft and weighs about 55 tons. *Snyder Tool & Engineering Co., Dept. RLC, 3400 E. Lafayette, Detroit 7, Mich.*

Lightweigh

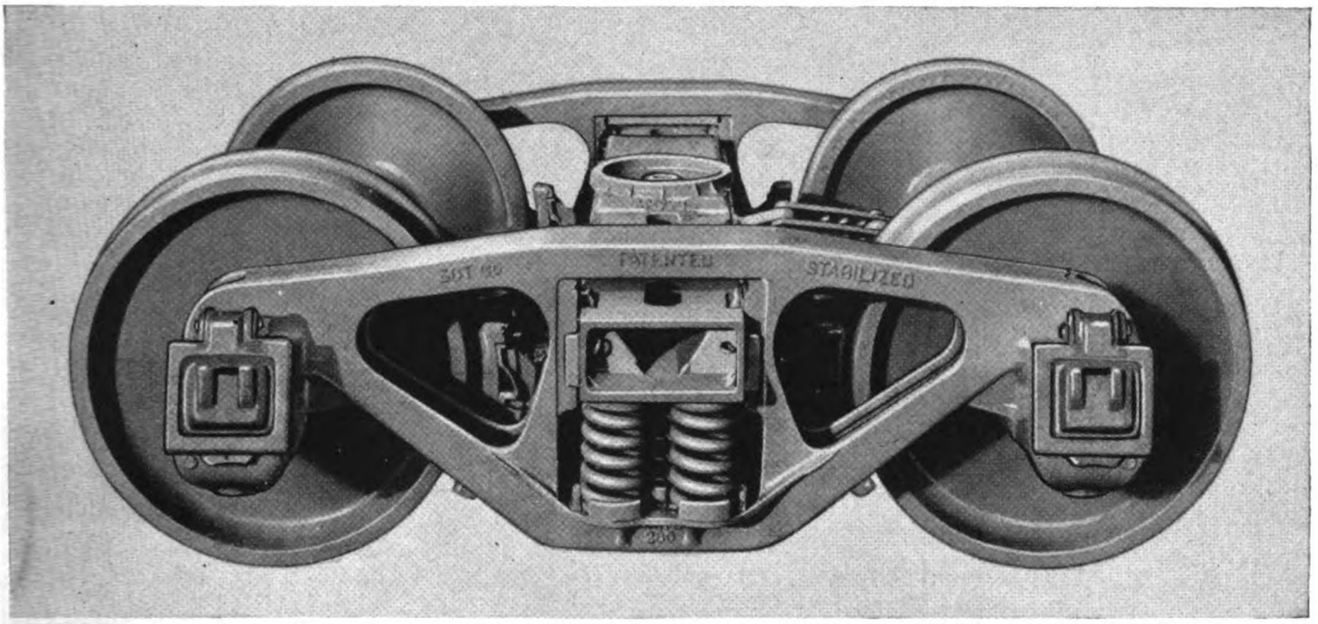
The coil-chain
models range fro
and feature mech
ton controls. For
hoist, the control
cable. The plasti
as a pistol grip. C
volts, regardless
The aluminum
sections to permi
Coffing Hoist Di
Dept. RLC, Danvi



Pneumatic L

The pressure bulk
lading device consis
inflatable walls. S
on the ceiling of
bulkheads can be
through a merchan
flated with low-pre
take up the remain
As the load com
transit, the air wal
additional space t

MODERN FREIGHT CARS BEGIN WITH



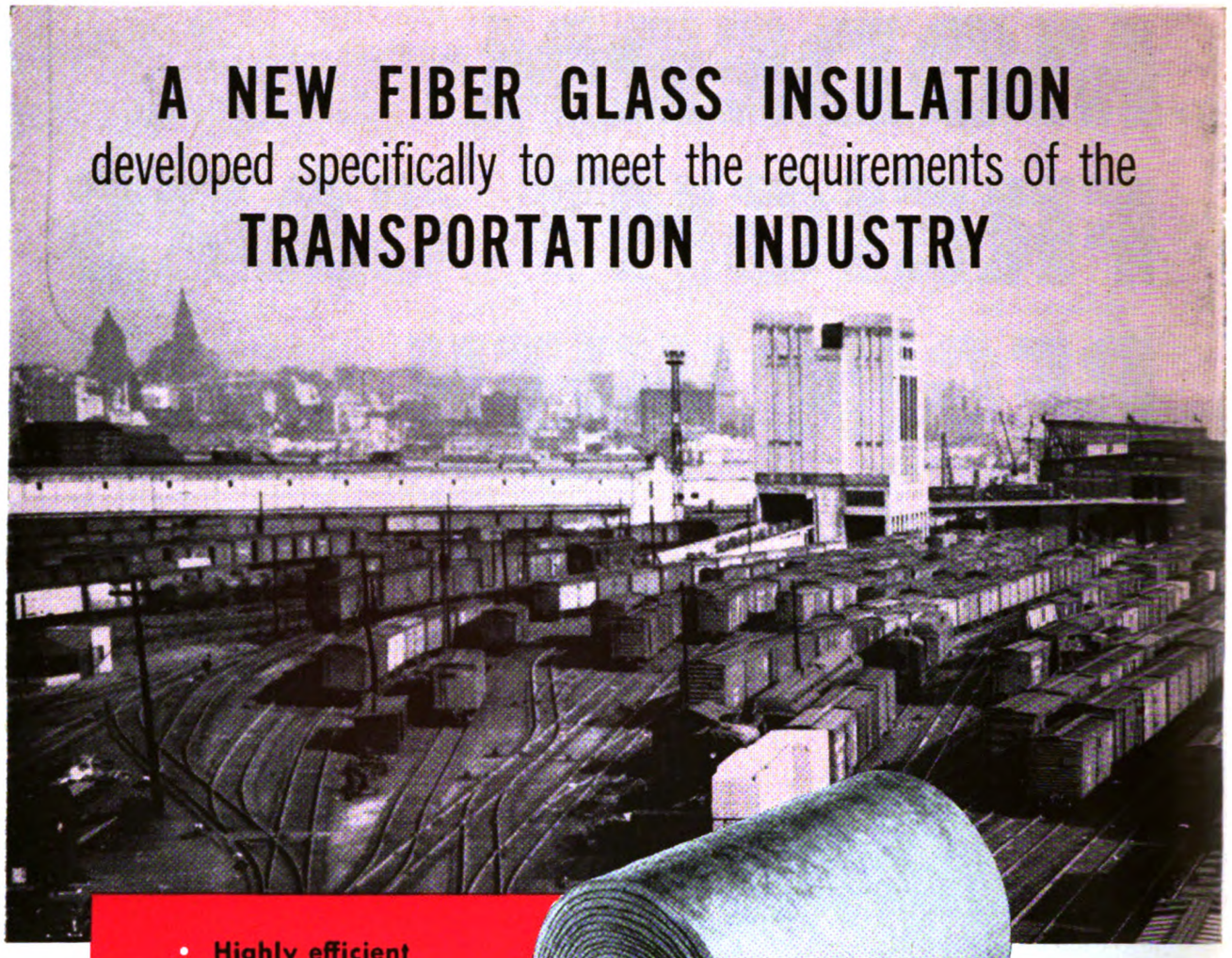
BARBER STABILIZED TRUCKS

MORE THAN 475,000 CAR SETS OF SM-O-O-O-O-THER RIDING BARBER STABILIZED TRUCKS SOLD

Standard Car Truck Company, 332 S. Michigan Ave., Chicago 4, Illinois.
In Canada: Consolidated Equipment Company, Ltd., Montreal 2, Quebec.

A NEW FIBER GLASS INSULATION

developed specifically to meet the requirements of the TRANSPORTATION INDUSTRY



- Highly efficient
- Moisture resistant
- Vibration resistant
- Durable
- Extremely lightweight
- Easily installed

WHAT IS TRANSULITE?

Transulite insulation is a lightweight, resilient blanket made of extremely fine glass fibers bonded together with a thermosetting resin.

It's *unique* because a specially developed binder minimizes moisture pick-up, even under severe operating conditions.

WHAT IS ITS BACKGROUND?

Transulite's background is the research laboratories of L·O·F Glass Fibers Company, where some of the most efficient thermal insulations known have been developed.

These insulations are widely used by the automobile, aircraft, original equipment, industrial construction and home building industries . . . also used in appliances, air conditioning systems, trucks and trailers, metal buildings, mobile homes and many other places.

L·O·F GLASS FIBERS

WHAT ARE ITS ADVANTAGES?

Because Transulite is especially designed for the transportation industry it offers:

Superior thermal performance—one of the most efficient on a heat-resistance-to-weight ratio.

Superior resistance to moisture—when tested for 14 days in a humidity cabinet—such as used in the railroad industry for refrigerated cars—total moisture pickup by absorption and adsorption combined was below the maximum permitted by the specifications.

Superior resistance to vibration—the most troublesome over-the-track operating conditions present no hazard. Transulite holds its position . . . resists sagging or settling when properly installed.

Superior durability—protects your long term investment because the inorganic glass fibers will not burn, rot or sustain rodents and vermin.

Transulite's extreme light weight adds very little to overall unit weight . . . permits increased payloads . . . makes it easier to install! Rolls are pleasant to handle and are compressed to require less storage space.

WHERE IS IT USED?

Transulite performs best where the requirements are the most exacting. Its superior thermal performance and resistance to moisture make it the ideal insulation for refrigerated cars.

Transulite, as well as Super·Fine, Microlite and Microtex, other products of L·O·F Glass Fibers Company, answer insulation problems for passenger cars, box cars, tank cars and cabooses.

Available in thicknesses and densities to meet specific requirements. Widths up to 120″.

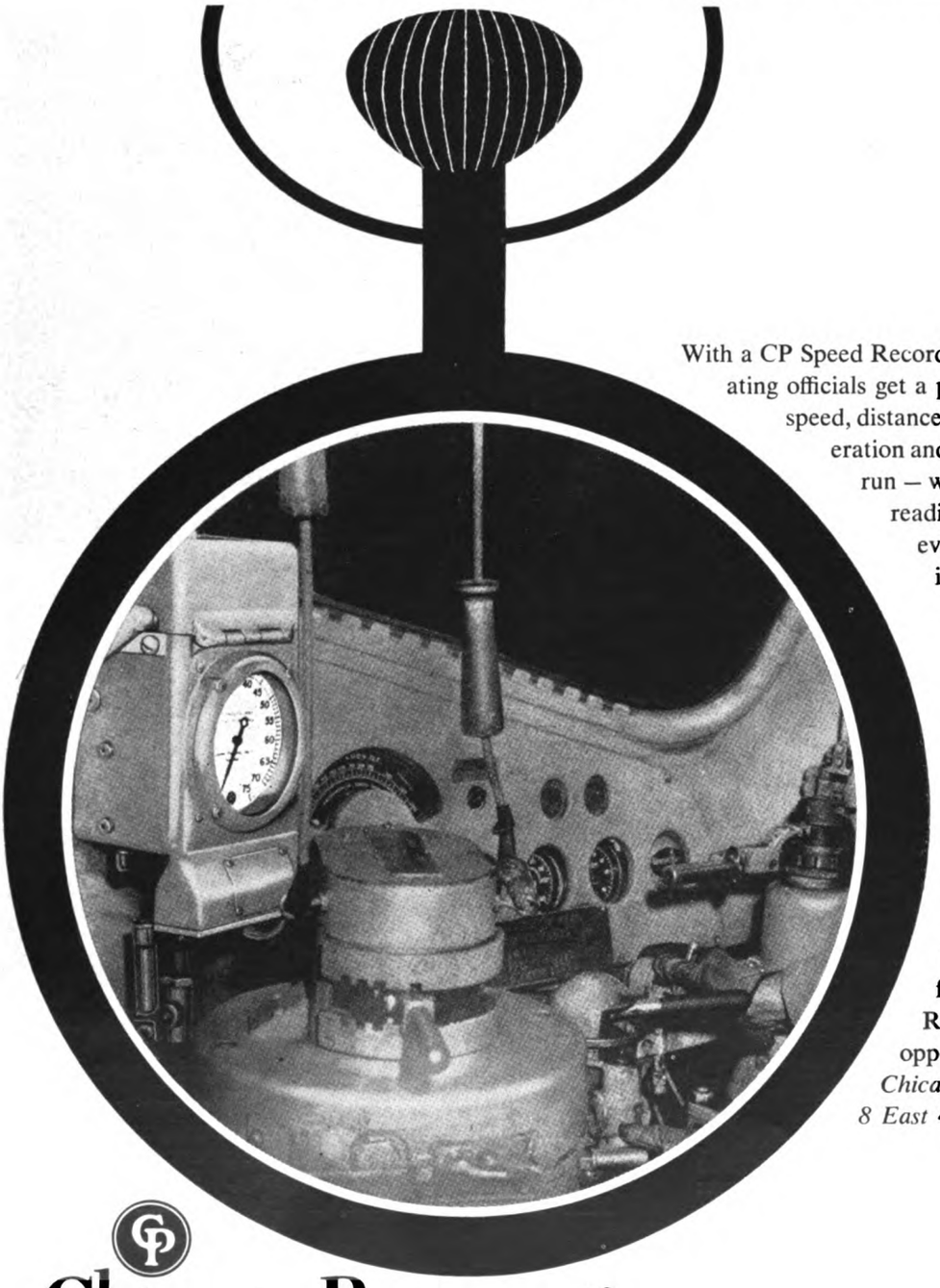
For more information about Transulite and how it helps to solve insulation problems, write to: *L·O·F Glass Fibers Company, Dept. 56-98, 1810 Madison Avenue, Toledo 1, Ohio.*

L·O·F GLASS FIBERS COMPANY

TOLEDO 1, OHIO

from departure – to arrival

CP SPEED RECORDERS GIVE PRECISE PERFORMANCE RECORDS



With a CP Speed Recorder installed in the cab, operating officials get a permanent record of running speed, distance traveled, acceleration, deceleration and wheel slippage for the whole run – while the engineer has easy-reading indication of exact speed every second the locomotive is in motion. CP Recorders and Indicators are available for road locomotives in two High Speed ranges: 0 to 75 MPH and 10 to 120 MPH. Two Slow Speed Recorders are also built for use on hump yard approaches and terminal areas. These models are rated 0 to 15 MPH and 0 to 35 MPH. For dual-controlled locomotives CP Recorders can be furnished with an auxiliary Remote Speed Indicator for the opposite side of the cab.

Chicago Pneumatic Tool Company, 8 East 44th Street, N. Y. 17, N. Y.

Chicago Pneumatic

SPEED RECORDERS AND INDICATORS • STATIONARY AND PORTABLE AIR COMPRESSORS • PNEUMATIC AND ELECTRIC TOOLS • HYDRAULIC RIVETERS

20-year overhaul of Reading "Crusader" proves...

beauty of stainless steel is more than skin deep

In 1937 the Reading Railroad put the all-stainless steel "Crusader" in service on the New York to Philadelphia run.

Twenty years and almost two million miles later, they brought the "Crusader" in for its third complete overhaul. The condition of its stainless steel completely justified the confidence shared by the Reading and the Budd Company, the "Crusader's" builders, in nickel-containing stainless as a highly practical material for railroad car construction.

Condition shows it's inexpensive, too

In the photos above, taken during overhaul, you can see for yourself the excellent condition of the "Crusader's" stainless steel exterior skin and structural members.

No scale. No corroded parts to be replaced. Accumulated dust under the sheathing was easily removed by scraping. Sheathing itself was restored to original condition merely by wiping. With only this minor maintenance, the "Crusader's" stainless steel looks — and is — as good as new, as modern as tomorrow!

There's more to stainless steel than meets the eye

In addition to such permanent resistance to corrosion, and lasting good appearance, stainless steel has a high strength-to-weight ratio. Permits lighter cars, important savings in fuel costs. And builders find that its ductility and weldability permit fast, simple fabricating methods . . . economical production.

"Nickel Alloys in Railroad Equipment," a 32-PAGE BOOKLET, describes how nickel-containing stainless steels and other nickel alloys can lower operating and production costs and improve safety factors in rolling stock, locomotives and trackwork. For your copy, just write Inco.

The International Nickel Company, Inc.

67 Wall Street INCO New York 5, N. Y.

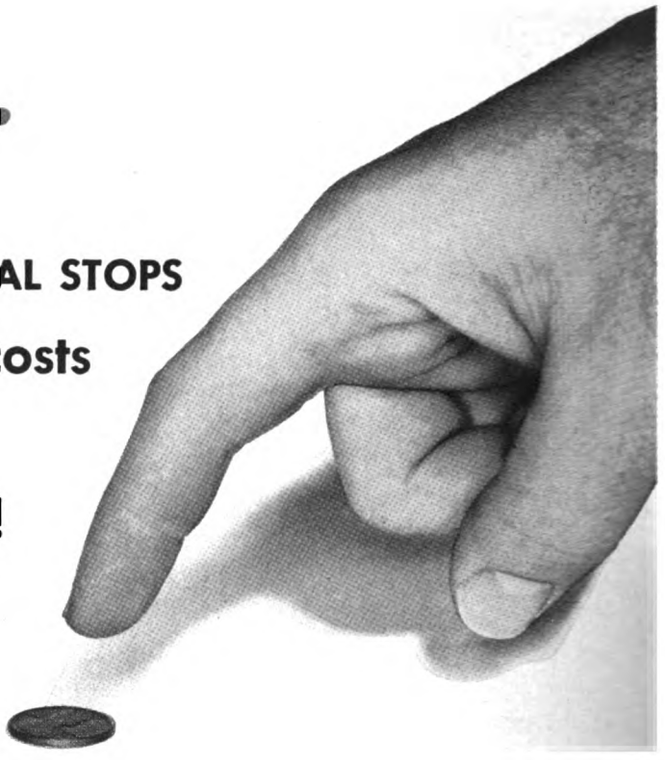
INCO NICKEL

NICKEL ALLOYS PERFORM BETTER LONGER

HOW SOLID BEARINGS AND JOURNAL STOPS HELP KEEP RAILROADS OUT OF THE RED

It's a fact...

that MAGNUS R-S JOURNAL STOPS can cut total hot-box costs to less than 1 cent per car per day!



Operating experience with more than 5,000 freight cars proves that Solid Bearings and Journal Stops are the low-cost solution to the hot-box problem

Railroads using low-cost solid bearings and R-S Journal Stops today average over 6,000,000 car miles per hot box. Conservatively, new users of R-S Journal Stops can increase hot box mileage 10 times — can cut hot box costs to a tenth of current costs on similar cars in similar service. That means less than ⅓ cent per car per day to cover all costs associated with bearing road failures.*

That's just one of the facts about R-S Journal Stops, proved now on over 5000 cars in service. Essentially, they stabilize the bearing assembly, help provide uniform, uninterrupted oil film lubrication, give the solid bearing a chance to work at optimum efficiency.

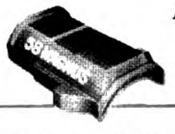
Results: you double bearing life, reduce wheel flange wear, cut necessary service attention, prevent dust guard damage — in short, save on truck maintenance all along the line. This reduced maintenance alone will save you enough to pay for the Stops in 3 years.

And with R-S Journal Stops, you still have all the other advantages which low-cost solid bearings bring to railroad rolling stock. You can take the maximum load, make the fastest schedule. Lading gets the smoothest ride. You save excess dead weight and get lowest possible running resistance in pounds per ton. Best of all, you'll be sure of the kind of bearing performance you want at a price you can afford to pay. Write us for all the facts. Magnus Metal Corporation, 111 Broadway, New York 6, New York; or 80 E. Jackson Blvd., Chicago 4, Illinois.

**Cost based on data compiled by the Mechanical Division of the Association of American Railroads in 1955.*

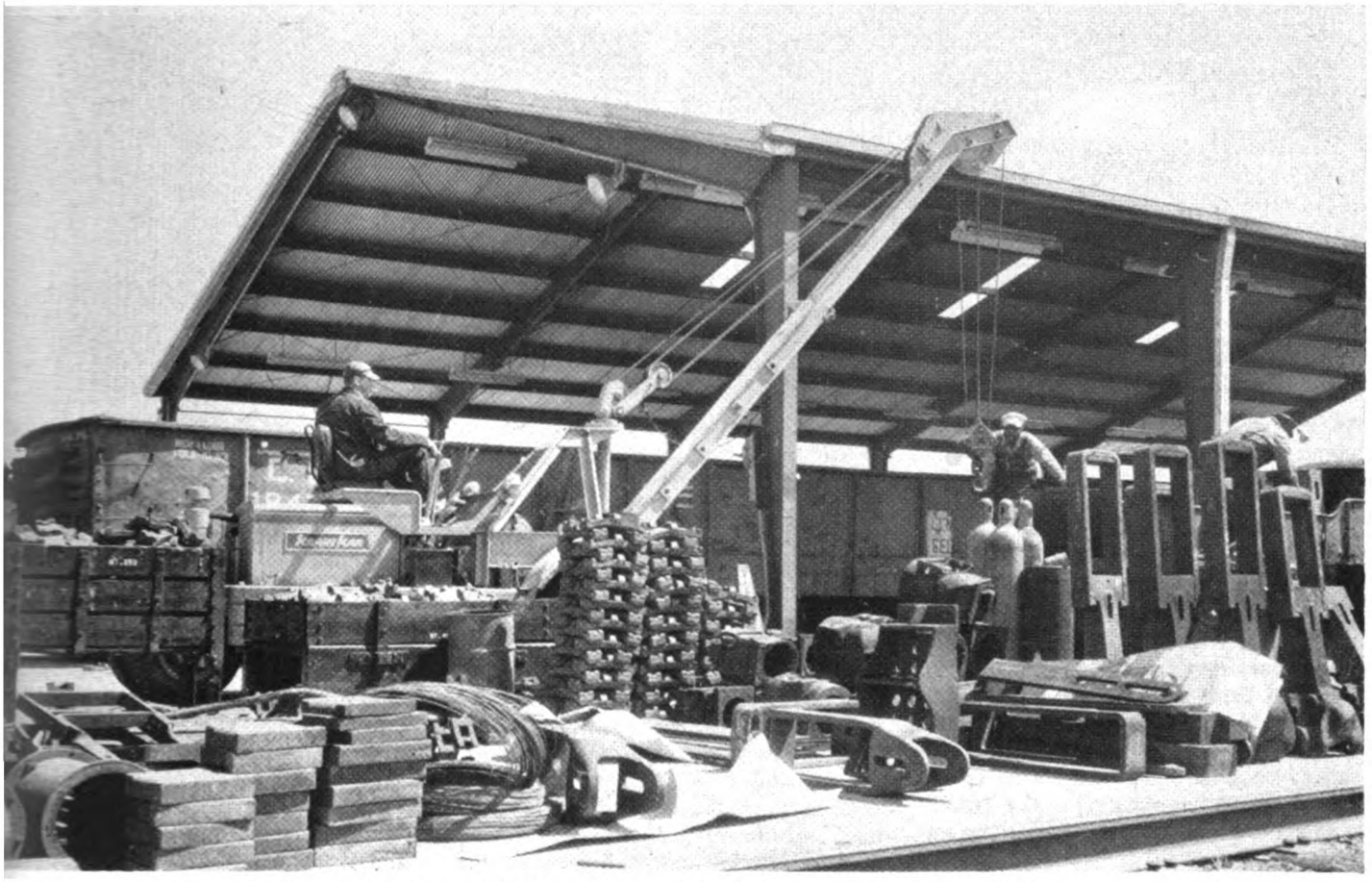
MAGNUS

Solid Bearings



Right for Railroads
...in performance...in cost

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**



laterial storage area is paved and has sufficient area so that items can be segregated and spaced for easy handling.

Spot Repair Facility Will Pay for Itself in a Year

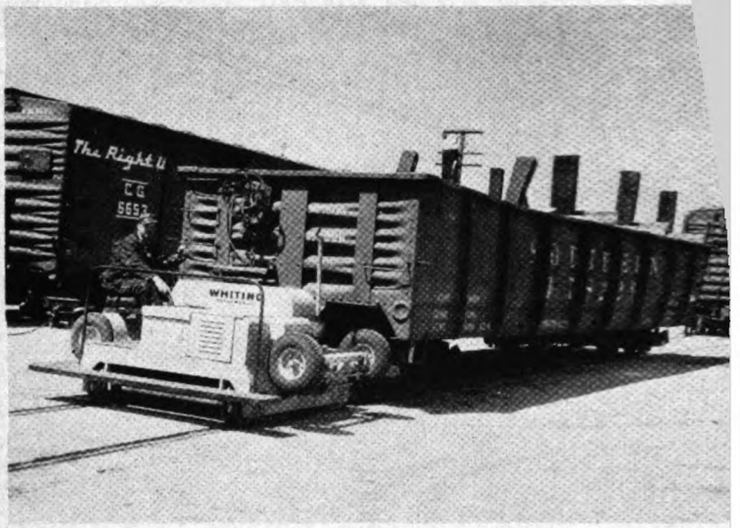
Its $98,000 investment at Macon is estimated to save the Central of Georgia $116,000 annually

THE BIGGEST SINGLE FACTOR in the nnual $116,000 saving produced by he new light car repair facilities at Macon, Ga., was summed up by D. Marshall, general car foreman, "In the past we would let the men go to the rouble but now we let the trouble come o the men." This is all possible because of $98,000 which the Central of Georgia has spent during the past two ears in relocating and reequipping its Macon rip track. The new "spot" repair acility is located between the receiving and departure tracks, and the classification yard at Macon's West yard.

While placing it so strategically, the Central of Georgia made sure there was adequate space, not only for cars and work areas, but also for the convenient storage of materials and for the location of necessary service buildings. This railroad has been a pioneer in mechanizing and modernizing its light repair tracks.

In 1954 the operation at Columbus, Ga., was modernized (*RL&C, Sept. 1954 p. 54*). This was followed two years later by another modernization at Atlanta (*RL&C, May 1956, p. 60*). The basic feature of these earlier installations, used again at Macon, is the assignment of two tracks for repair work.

All work is done on the cars spotted on one track while it is "blue-flagged." During this time, no work of any kind is done on the other track so that switching crews can kick bad-order cars into it as inspectors find them. After all cars on the first track have been repaired, it is opened so that these cars can



Trackmobile moves cars in the repair area. Broad paved areas facilitate it operation. Earlier CG installations used car pullers.

be moved out; and the track will become available for other bad orders while the car repair force then confines its operations to the second track. The "spot" system is used exclusively with each car moved up to a single work area.

While these features are common to all of the revised Central of Georgia car repair installations, the Macon facility incorporates a number of new ideas. Some of these changes can be justified because Macon is the largest yard on the CG and the volume of work there makes possible equipment which could not be justified at other sites. The "spot" where men and tools are located is an open-sided shed 70 ft wide and 100 ft long. The two tracks pass through it on 40-ft centers. Earlier installations had no such protection and it is expected that elimination of work interruptions due to bad weather will save $10,000 annually.

Previously, the Central of Georgia has used winch-type car pullers for moving cars once they were switched to the repair tracks. This time, a small Trackmobile was purchased to do the job. Roadways and work areas around the repair tracks are paved and this simplifies the Trackmobile operation. At the same time, it mak
of car parts from
areas. A crane tru
handling.

A completely eq
shop included in th
possible lining and
cars which are bac
reasons. The first f
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lining and floor re
have otherwise requi
the car shop.

Because of the nu
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of train arrivals and
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tion forces was not
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yards have made possib
of these two work gr
savings in labor costs.

Repair Shelter

The 70 by 100 ft shed
a concrete-paved area. E
tracks is equipped with r
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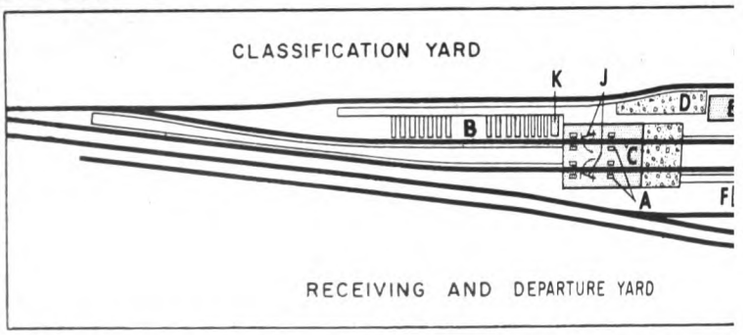
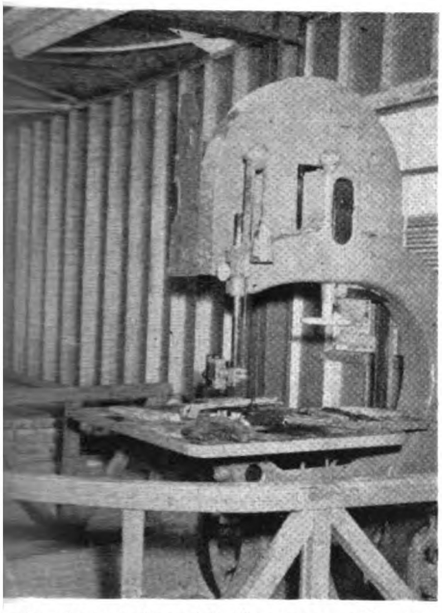
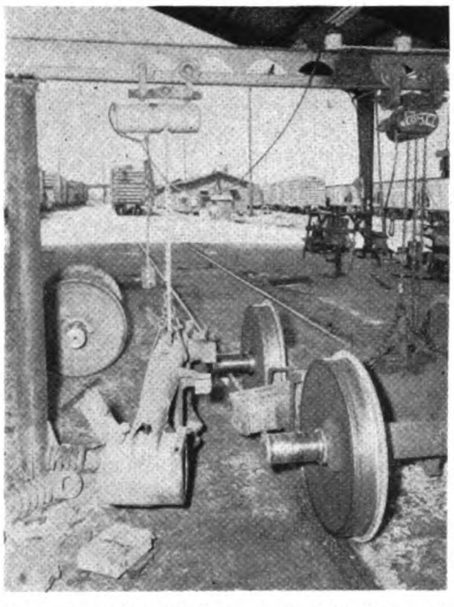
Georgia tracks had truc



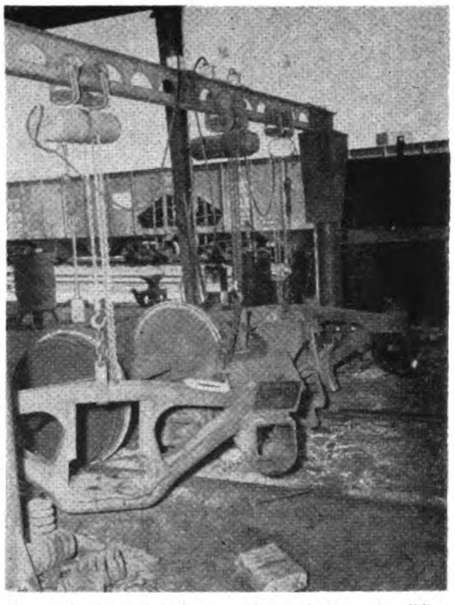
Large light repair installation was based on previous experience with such facilities and in work area, "D" car parts storage, "E" lumber storage and planing mill, "F" office and air br mast crane, "K" brass and brake storage. Tracks hold 20, 24 and 11 cars from top to bottc



oodworking tools and inside storage make pos-le lining repairs.



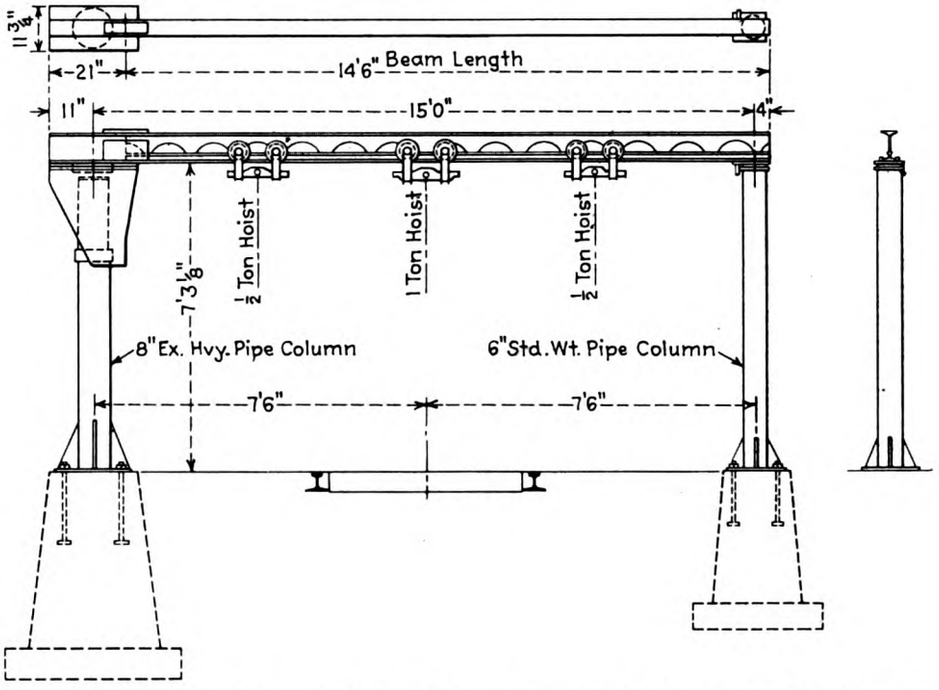
Crane tramrail must be supported by this post when being used.



Pedestal crane with its three hoists simplifies truck tear down.

This Equipment Was Purchased

Trackmobile, Whiting Model 2TM
Krane Kar with telescopic boom, 10,000 lb, odel "AX"
Pipe Master, Oster No. 52
Cut-off saw, Heston & Henderson 16-in. Model
Surfacer, 18-in. x 6-in., Yates-American Model 180
Band saw with tilting table, 20-in., Yates-Amer-an Model J-120
Jointer, 8-in. Yates-American Model J-13
Pedestal grinder, Cadet Model No. 24FAS
Water coolers, Westinghouse Electric, Model AC-2
Electric hoist, 1,000 lb, Comet Model HEC-F
Electric hoists, 2,000 lb, Comet Model HEC-L



Cleveland tramrail is used to construct pedestal crane. The crane is then fitted with three hoists to make possible the disassembly of trucks.

ood loads. It is equipped with one of ıe Central of Georgia's now familiar ydraulic pulpwood adjusters.

To produce the savings possible by ıaking lining repairs, it was necessary ɔ equip the shop with wood working ıachines and lumber storage They are ɔcated in a prefabricated steel building. Two other prefabs were used. One is the ffice and air brake building and the ıther is used for a locker room.

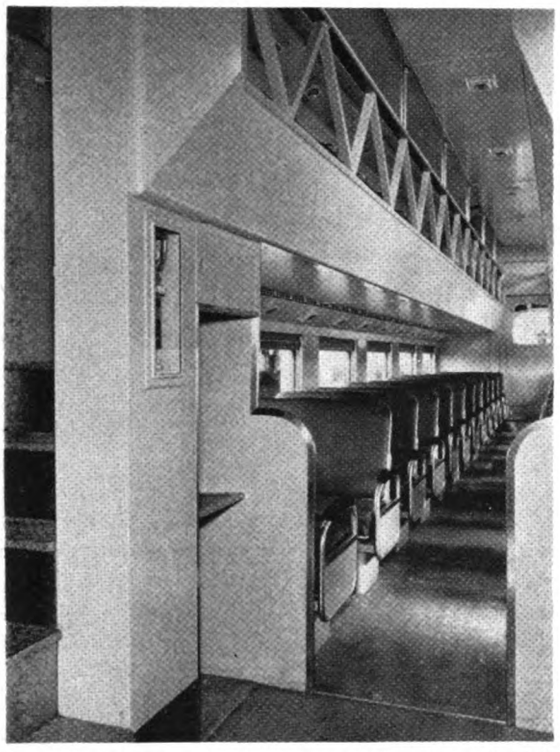
Labor Force

This light repair track is staffed by wo shifts daily, seven days a week. A oreman, four carmen, one apprentice ınd one helper comprise the first shift crew. A foreman, two carmen and a helper work the second trick. The fore-ıan on each shift also supervises the train yard inspectors. These inspectors do not normally work as car repairmen because the arrival and departure of trains is fairly uniform and they can be used continuously in the yard. If there is idle time, these inspectors adjust pulp-wood loads.

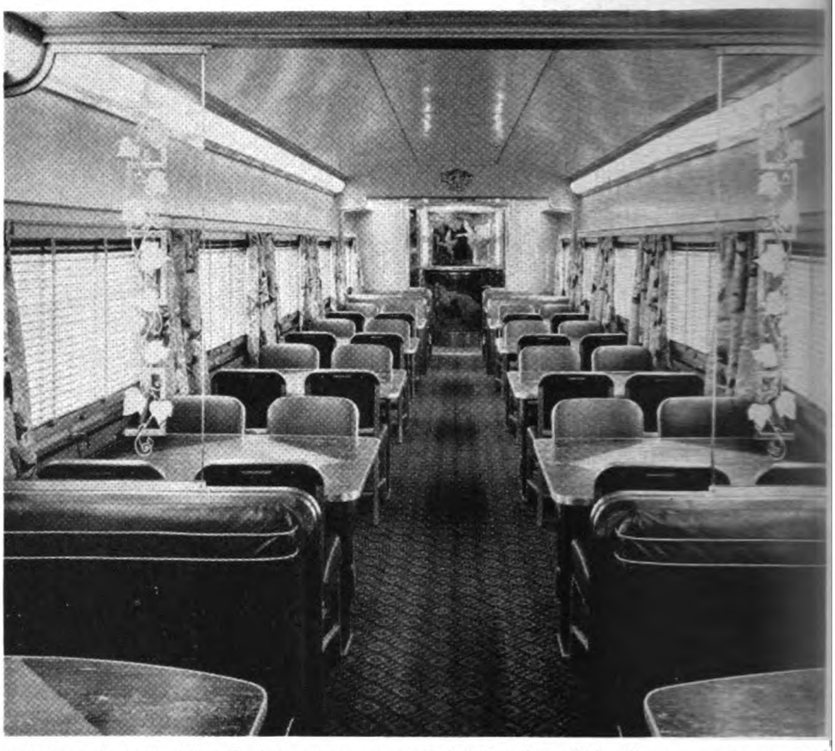
Since it went into operation, this track has been making repairs to from 35 to 45 cars on the first shift each day; and between 5 and 10 cars are repaired on the second shift. Freight car repairs are made rapidly enough that frequently the cars can be forwarded in the trains to which they originally assigned. With an average repair time of about 4 hr, the saving in car delay is often 24 hrs or more.

An estimated saving of $60,000 per year is possible because increased productivity enables the Central of Georgia to equalize A A R billing and repair card accounts. This productivity also saves $16,000 per year in per diem. Another $20,000 in per diem charges is saved because cars no longer need to be moved to the repair shop for lining and flooring repairs. The strategic location of this facility—in the middle of the classification yard—makes possible a saving in switching costs estimated to total $10,000 annually. The shelter now makes it possible for work to go on continuously even during bad weather and this steady production is worth another $10,000 yearly according to Central of Georgia estimates. Increased productivity and reduction in per diem and switching charges produce the total saving estimated to be $116,000.

To Refinish Cars Like These . . .



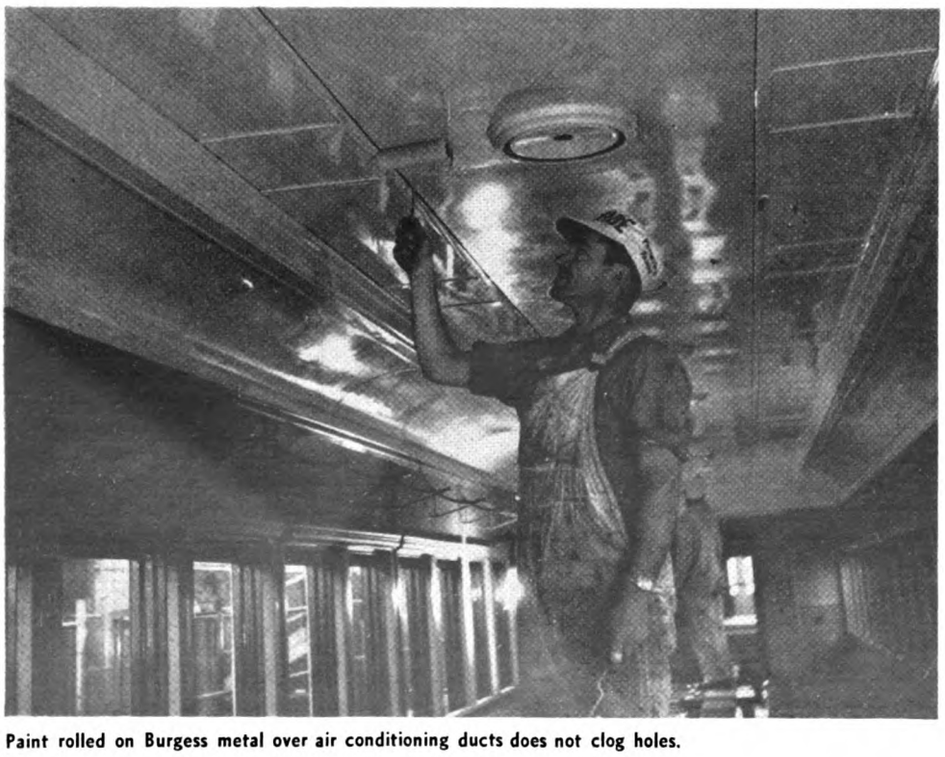
Two-color gallery car interiors get complete roller paint job in about 100 hrs. Taping of trim and masking is eliminated



Interiors of many of the Zephyr cars are repainted with rollers. Older diners are also repainted this way even though they have three-color paint scheme.

The Burlington Now Rolls Its Paint

For many passenger cars, this method is faster and cuts both labor and material costs at Aurora shop



Paint rolled on Burgess metal over air conditioning ducts does not clog holes.

IN THE AURORA, Ill., shop of the Chicago, Burlington & Quincy, interiors of the Zephyr trains, suburban gallery coaches and many other passenger cars are given two coats of paint with rollers. No masking is done, and the railroad estimates it saves about 40 per cent in material, plus three to four days shopping time. This painting can be done with the car either under cover or outside. Spraying the interior requires that a car be in a spray wing of the shop building; and makes it impossible to do other work at the same time—either inside or outside the car.

When cars are received in the shop for general repairs, they are blown out, air-conditioning ducts cleaned, and seats removed. A special fluid soap is used to wash ceiling, walls, seat frames and other surfaces. The cars are then dried.

The Zephyr cars require four to six colors and have considerable chrome trim. When sprayed, it was necessary to mask after each color was applied. Where two colors do not join, each was

sprayed and left overnight to dry. Using rollers, each color can be applied separately or simultaneously and no masking is needed. For the spraying method, an average of 8 to 10 rolls of tape and one roll (60 lb) of kraft paper is required for masking, with 12 hr initial taping and 2 hr additional for each coat.

Gallery Cars

The gallery cars, which have two colors and some metal trim, generally get one coat of paint, although two may be given if the condition of the car requires them. Seats and cushions are removed. Car interiors can be completely painted in about 100 hr using rollers. Like the Zephyr cars, considerable masking, taping and preparation necessary for other painting methods, make the use of rollers economical.

The stainless-steel coaches have three colors, and, while some cars are sprayed, the majority are rolled. It depends on the class of repairs and the arrangement of color schemes for walls and ceilings. When light repairs are scheduled, the base and hallways are usually rolled. The Burgess metal over the air-conditioning ducts is generally rolled, because a brush leaves the holes clogged up. It takes about 18 hr per coat to roll the paint on. Rollers are used in dining cars, which have three colors. Rolling these diners gives a quicker job because of the simplicity of side wall and ceiling construction.

Best Rollers

The most effective paint rollers are those 7 in. and 1 in. wide, having mohair pads which give a light stippled covering film. Synthetic semi-gloss interior enamel is used. The paint is carefully prepared and mixed, if necessary, to provide uniform tints. Paint from the can, cut 10 per cent, is good for roller application. The rollers are cleaned by dipping in thinner. The roller pads are left in the thinner can to soak off the paint. This saves time over cleaning spray equipment, with its hose, spray gun and tank.

Considerable paint is saved by using the roller method. In the stainless steel coaches and dining cars, the roller method uses about 5 gal of paint as compared with 9 to 10 gal with the spray method. There is also considerable advantage in using rollers when cars have to be touched up during a layover at the end of a run. Previously, if passageways and sides of cars were soiled, a brush coat was given, resulting in brush marks. One coat of enamel, applied with rollers, dries in about four hours without streaking and gives a much more satisfactory job.

Coordinated Mechanical Meetings in Chicago, September 15 - 16 - 17

The 1958 meetings of the Coordinated Associations will be at the Hotel Sherman in Chicago. Its 1958 meeting will be the fiftieth held by the Air Brake Association. Officers of each association and the Committee of the Coordinated Associations appear below. Programs are on the next page.

Air Brake Association

C. C. Maynard (CNR)
President

J. B. Ball
Secretary-Treasurer

Car Department Officers Association

H. L. Hewing (CCIB)
President

E. W. Gebhardt
Secretary-Treasurer

Locomotive Maintenance Officers Association

F. R. Denney (NOUPT)
President

C. M. Lipscomb (MP)
Secretary-Treasurer

Railway Fuel & Operating Officers Association

O. D. Teeter (D&RGW)
President

L. H. Peters
Secretary-Treasurer

Committee of the Coordinated Associations

T. T. Blickle (AT&SF)
Chairman

J. A. Welsch
Illinois Central

J. H. Heron
Great Northern

J. D. Ristine
Secretary

Programs on Next Page ▶

Programs of Coordinated Mechanical Associations Meetings

HOTEL SHERMAN, CHICAGO

Air Brake Association—*Crystal Room*

Monday—September 15

10 am

Address: Pres. C. C. Maynard.
Address: A. Campbell, president, International Equipment Co.—"Creed of the Rails."
Present Repair Track Maintenance Procedures—Montreal Air Brake Club.
Trends in Air-Brake Shop Facilities—Manhattan Air Brake Club.
Modern Air-Brake Shop Facilities, E. W. Wingate, assistant general air-brake inspector, C&O.

2 pm

Joint meeting with RF&OOA

Address: R. M. MacDonald, director of operation, Board of Transport Commissioners for Canada.
Panel discussion—Train Handling.
Budd Frate Brake—R. G. Stacy, Budd Co.

Tuesday—September 16

9 am

Basic Operating Characteristics Passenger Car Brake Equipment, St. Louis Air Brake Club.
Effects on Air-Brake Equipment of External Heat Applied to Railroad Equipment for Thawing Frozen Commodities—Central Air Brake Club.
The Composition Shoe Contribution to Modern Railroad Service, P. O. Willaman, Westinghouse Air Brake Co.
Limitations of Pneumatic Air-Brake Control, H. N. Sudduth, New York Air Brake Co.

2 pm

Tour of Electro-Motive Division.

Wednesday—September 17

9 am

Elections.
Malfunctions and Remedies of Air Brake Equipment—Pittsburgh Air Brake Club.
Question Box.
Committee reports.

Car Department Officers Association—*Louis XVI Room*

Monday—September 15

10 am

Address: Pres. H. L. Hewing.
Report: Construction, Maintenance and Upgrading Freight-Car Equipment.
Address: E. E. Foulks, assistant vice-president-operations, CRI&P.

2 pm

Report: AAR Loading Rules.
Report: Interchange and Billing for Car Repairs.
Report: Wheel-Shop Practices.

Tuesday—September 16

9 am

Report: Light Repair Tracks and Train-Yard Operation.
Address: L. L. Adams, assistant to vice-president, traffic, United States Steel Corp.
Report: Maintenance of Passenger Car Equipment.

2 pm

Report: Car Lubrication.
Comments: W. M. Keller, vice-president (research), AAR.

Wednesday—September 17

9 am

Report: Air-Conditioning Equipment, Operation and Maintenance.
Report: Maintenance and Servicing of Mechanically Equipped Refrigerator Cars.
Report: Painting—Modern Methods in Finishing Railroad Equipment.
Miscellaneous reports.
Election of officers.

Locomotive Maintenance Officers Association—*Grand Ball Room*

Monday—September 15

10 am

Address: Pres. F. R. Denney.
Address: T. T. Blickle, general manager-mechanical Atchison, Topeka & Santa Fe.
Report: Diesel Mechanical—Other than Engine.

2 pm

Report: General Diesel Maintenance Subjects.
Report: Shop Equipment.

Tuesday—September 16

9 am

Address: C. W. Taylor, director, Bureau of Safety and Service, ICC, Subject: Certain Functions of the Bureau of Safety and Service Affecting Locomotive Maintenance.
Report: Diesel Electrical.

2:30 pm

Tour of AAR Research Laboratory.
Tour of Electro-Motive Division.

Wednesday—September 17

9 am

Report: Diesel Engine Maintenance.
Report: Diesel Material Reclamation.

2 pm

Report: Steam Generator Maintenance and Water Treatment.
Report: Fuel and Lube Oil.

Railway Fuel and Operating Officers Association—*Bal Tabarin*

Monday—September 15

10 am

Address: Pres. O. D. Teeter.
Report of secretary.
Address: R. Knox Bradford, vice-president-traffic, D&RGW.
Safety film.
Employee Responsibility in Promoting Public Relations, Douglass Campbell, vice-president, NYC.
Progress of Oil-Burning Gas-Turbine Electric Locomotive, C. Shipman, supervisor air-brake instructions, UP.

2 pm

Joint Meeting with Air Brake Assn.

Address: R. M. MacDonald, director of operation, Board of Transport Commissioners for Canada.
Panel discussion—Train Handling.
Budd Frate Brake—R. G. Stacy, Budd Co.

Tuesday—September 16

9 am

Radiation Studies of Fuels, Ray McBrian, director research, D&RGW.
Freight Loss and Damage Prevention, L. E. Adams and H. J. Machlitt, investigator freight claim department, B&O.
Railroad Retirement—Social Security.
Panel discussion—Training Operating Personnel on Rule Compliance.

2:15 pm

Progress in Treatment of Fuel Oil, J. J. Wright, director of technical research, NYC.
Impending Legislation and Competitive Transportation Affecting Future of the Railroads, L. W. Horning, vice-president, NYC.
Panel—Economical Utilization of Power.
Treating of Rails Chemically, G. W. Luvisi, manager products development, National Aluminate Corp.

Wednesday—September 17

9:30 am

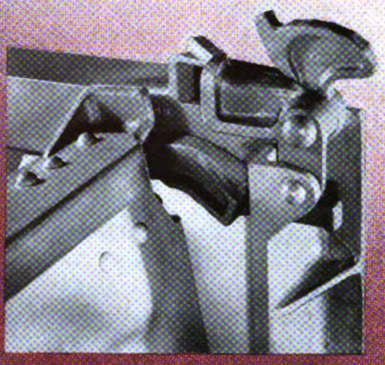
Planned Supervision—Personnel Selection and Training, N. P. Patterson, superintendent personnel, PRR.
Panel discussion—Diesel Troubles.

2 pm

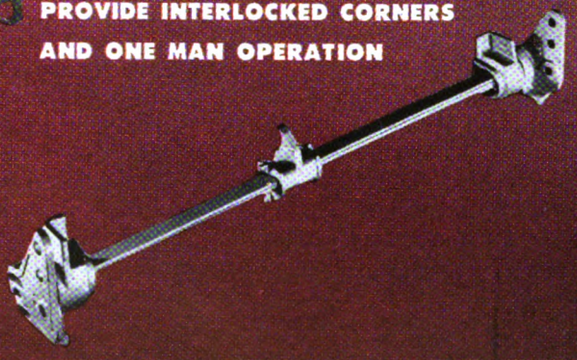
Official business.
Duties and Responsibilities of an Operating Officer, E. L. Reeves, superintendent, B&OCT.

INCORPORATED DROP-END UNITS

Speed Service..
Sustain Structure



PROVIDE INTERLOCKED CORNERS
AND ONE MAN OPERATION



WINE

Drop End Locks
and
End Balancers

THE WINE RAILWAY APPLIANCE COMPANY
TOLEDO 9, OHIO

Combustion Characteri

- ***Can these fuels be burn***
- ***Do their qualities vary t***
- ***Can engine settings be c***

THERE ARE SEVERAL "economy" diesel fuels which are being used or have been considered for use in locomotive diesel engines. Some are low-cetane distillates containing cracked stocks and boiling in the ASTM 2D diesel-fuel range. Others are distillate-residual fuel blends or straight residual fuels having viscosities as high as 3,000-4,000 SSU at 100 deg F. The name "economy" implies that these fuels cost less than conventional 2D fuels.

Much has already been written about the advantages and disadvantages of economy diesel fuels—particularly about their effect on deposits, wear, lubricating-oil contamination, and handling practices. The object of this work was to investigate the combustion characteristics of economy fuels. The specific objectives were to answer the following questions:

1. How does a locomotive diesel run on economy fuels at standard engine settings—those used when running on regular 2D type diesel fuel? A railroad operating a large number of engines might find it desirable to switch over to "economy" fuel in all engines at the same time. However, it may often be inconvenient to alter engine settings on all these engines at the same time.

2. Should changes be made to engine settings to provide the same power obtained with regular 2D type diesel fuel, or the most economical operation with economy fuels? In some cases, these fuels would provide more or less power than obtained with a 2D fuel. This becomes important where fixed load factors and schedules are to be maintained. It may be desirable to alter the engine settings to provide the same power as obtained with regular 2D diesel fuel.

3. Are there formance cha fuels having s erties but diff and crude sou resent the "dreg tions, and as s centages of which are not e

The answers t help the potenti assess their valu was done with fuels and four h answers are sp involved, they performance tre to be encounter

These studies laboratory EM locomotive dies same features 567B engines. T ered inoperative tings were cont The engine was coupled generat output was obta horsepower. St jectors were use

Seven Fuels

Seven fuels series of tests. T fuel was the ba treated West C tillate stocks. T 30-cetane fuels w Coast stocks to to the 42-cetane number and co tained cracked st

Blend A was a deg F) distillate containing about of mixed straight distillate stocks heavy cracked d being residual st erations. All of obtained from p

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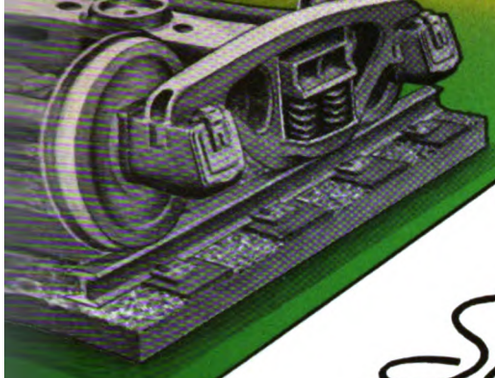
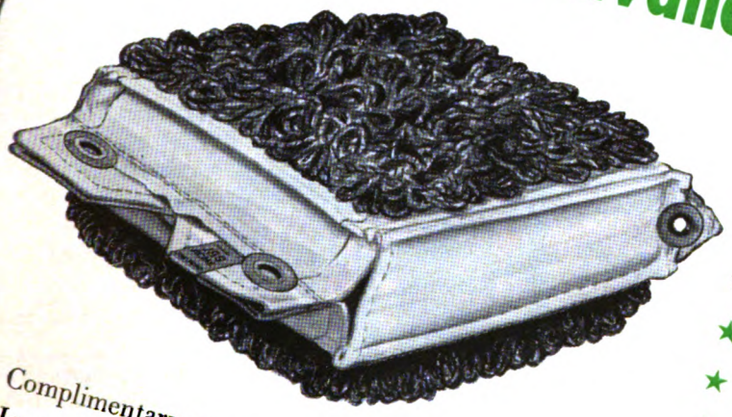
This is an abstract of a paper presented by T. A. Kramer, supervising technologist, and D. P. Osterhour, Jr., supervising technologist, both of the Research and Development Laboratory, Socony Mobil Oil Co., Paulsboro, N.J., at the Oil and Gas Power Conference of the American Society of Mechanical Engineers, in Philadelphia.



MEMO FROM THE GENERAL OFFICE

Jim—Still too many hot boxes Suggest using Acme Lubricators

The JBS ACME LUBRICATOR is a Positive Advance in Journal Lubrication



- ★ Retains 4 times its own weight in oil
- ★ Requires no modification of journal box
- ★ Wicks AAR specification car oil even in coldest weather
- ★ Assures better performance with less servicing
- ★ Cannot Glaze—Wool-cotton chenille loop surfaces
- ★ Has exclusive patented all-wool quilted core*
- ★ Reinforced for extra wear
- ★ Readily reclaimed

Complimentary reports are coming in from scores of railroads throughout America, Canada and Alaska using JBS Acme Journal Lubricators, a product of the Journal Box Servicing Corporation, that JBS Acme Lubricators are greatly reducing hot boxes in their operations. JBS Acme alone has the exclusive all-wool quilted core* which retains many times its own weight in oil reserve. Heavy chenille loop pile surfaces assure an ample supply of filtered oil at all times and prevent glazing. JBS Acme Lubricators are unaffected by temperature changes and wick AAR specification car oil even at 45° below zero in road service tests. JBS Acme Lubricators require no modification of the standard journal box, are designed to hold their position in the box, and assure better performance with less servicing.

Write Today for Information and Folder

GUARANTEED
Quality, Workmanship and Material as represented

Copyright 1958—Journal Box Servicing Corp.

*Patent applied for

JOURNAL BOX SERVICING CORP.

"30 Years in Car Lubrication"

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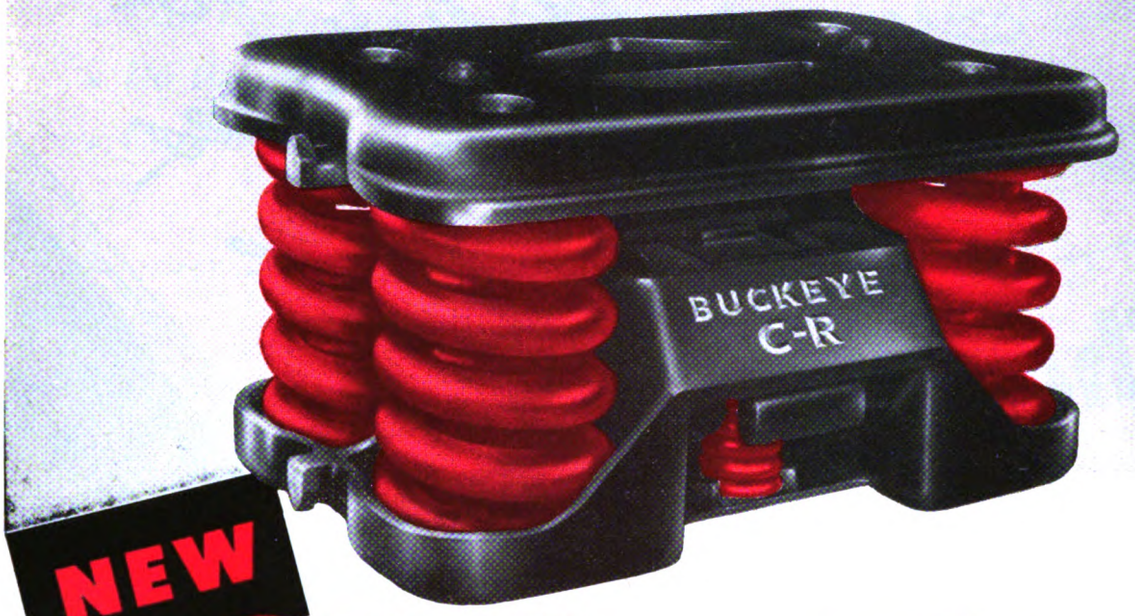
LOW COST MODERNIZATION
FOR CARS OF ALL CAPACITIES..



NEW

C-R®

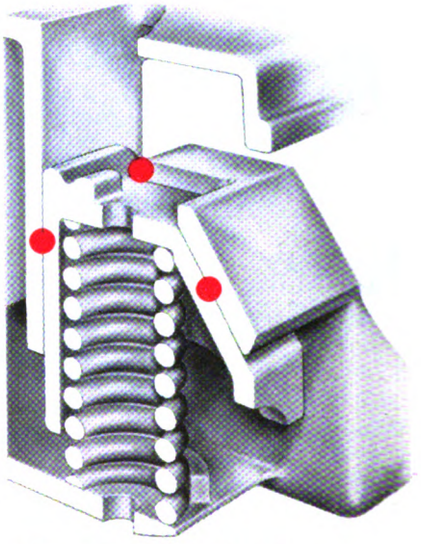
(Cushion-Ride)

PACKAGE UNIT

Applicable to *all* previously built, non-friction control trucks. Available with 2-1/2″ or 3-1/16″ spring travel.

ENGINEERED and BUILT BY

Buckeye



CUTAWAY OF THE BUCKEYE C-R PACKAGE UNIT SHOWING THE FEATURED MAXIMUM FRICTION BEARING SURFACES.

FOR COMPLETE INFORMATION..CALL OR WRITE
Refer Adv. 11880

Ask for Bulletin No 204

'Economy' Fuels . . .

(Continued from page 38)

have shown that, at part load, excessive injector deposits can seriously interfere with engine operation with some heavy fuels, but fairly good operation could be maintained at full or rated load. It was not the objective of this program to conduct a deposit study.

The engine operating conditions used in this study were: engine speed, 800 rpm; engine-water temperature, 190 deg F; fuel pressure, 30 to 40 psi; oil pressure 44 to 49 psi; and oil temperature, 230 deg F. Temperatures of fuel to injectors were 150 deg F for heavy fuels and 80 to 100 deg F for distillate fuels.

Each fuel was tested at a range of injector-rack settings at constant rated speed to obtain the following data: power output, specific fuel consumption, peak cylinder pressure, exhaust temperature, and exhaust smoke. In addition, pressure-time diagrams from a dual-beam oscilloscope produced data on ignition delay, time for occurrence of peak pressure, and duration of pressure rise. Observations were made to detect any unusual operations or engine roughness.

The work was under taken in two stages. The first step was a study of the performance of the low-cetane economy distillate fuels as compared to the 42-cetane regular 2D type fuel. The second test series compared the performance of the heavy economy fuels with the 35-cetane economy-distillate fuel.

Performance of the 35-cetane fuel was not the same in each study. This is attributed to differences in the injectors and the condition of the engine. In each study, a given set of injectors was used throughout the testing; but a different set of injectors was used in each program.

All information was obtained in short-time tests. No attempt was made to determine the effect of these fuels on deposits and wear. Long-term laboratory and field tests would be needed to determine the over-all economy resulting from these fuels.

These Are the Fuels Which Were Tested

	2D Type	35 Cetane	30 Cetane	Blend A	Blend B	Blend C	Heavy Distillate
Cetane Number	42	35	30	27	29	35	26
Gravity, lb per gal	7.18	7.44	7.64	8.26	8.17	7.87	8.10
Heat content, Btu per lb	19,505	19,027	19,135	18,068	18,193	18,620	18,259
Sulfur, per cent	0.47	0.47	0.73	1.25	1.46	2.30	1.10
Viscosity, SSU at 100 deg F	37.0	36.6	39.9	310.3	300.0	319.6	115.4
Pour point, deg F	15	10	10	35	30	5	65
ASTM distillation:							
Initial boiling point..	404	401	440	414	448	358	506
10 per cent	445	470	506	549	526	502	632
50 per cent	504	525	558	683	668	734	685
End point	675	645	664	---	---	---	756

Here Are the Results of the Test

FUEL	RACK SETTING In.	Bhp per Cyl.	FUEL RATE Lb per Bhp-Hr	FUEL RATE Gal.per Bhp-Hr	THERMAL EFFICIENCY Per Cent	EXHAUST TEMP. Deg F	PEAK PRESSURE Psi	SMOKE
DISTILLATE FUELS								
Recommended Standard Rack Setting (24/64 in.)								
30 Cetane	24/64	95.3	0.451	0.0590	29.55	908	1145	3
35 Cetane	24/64	97.3	0.447	0.0594	30.02	895	1127	4
42 Cetane	24/64	92.9	0.441	0.0615	29.61	886	1115	3-
Constant Power Level (42 Cetane Fuel with 24/64-in. Rack Setting as Basis)								
30 Cetane	26/64	92.9	0.453	0.0592	29.40	878	1122	-
35 Cetane	25/64	92.9	0.449	0.0594	29.45	882	1120	-
42 Cetane	24/64	92.9	0.441	0.0615	29.61	886	1115	3-
Optimum Economy Fuel Rack Setting								
30 Cetane	22/64	99.7	0.449	0.0588	29.57	939	1160	3
35 Cetane	22/64	99.0	0.446	0.0592	29.65	908	1135	3
42 Cetane	20/64	99.8	0.436	0.0608	29.91	931	1150	-
HEAVY FUELS								
Recommended Standard Rack Setting (24/64 in.)								
35 Cetane	24/64	92.0	0.442	0.0594	30.3	900	1025	3
Blend A	24/64	97.4	0.470	0.0569	29.9	965	1080	3+
Blend B	24/64	95.6	0.464	0.0568	30.1	940	1050	2+
Hvy. Dist.	24/64	96.8	0.458	0.0565	30.4	940	1120	3
Blend C	24/64	93.2	0.460	0.0584	29.8	931	--	-
Constant Power Level (35 Cetane Fuel with 24/64-in. Rack Setting as Basis)								
35 Cetane	24/64	92.0	0.442	0.0594	30.3	900	1025	3
Blend A	26/64	92.0	0.472	0.0571	29.8	930	1050	3-
Blend B	26/64	92.0	0.466	0.0571	29.9	900	1025	3-
Hvy. Dist.	26/64	92.0	0.461	0.0569	30.2	900	1095	3-
Blend C	24/64	92.0	0.460	0.0584	29.8	931	--	-
Optimum Economy Fuel Rack Setting								
35 Cetane	20/64	101.0	0.439	0.0590	30.4	965	1070	3+
Blend A	22/64	101.9	0.469	0.0568	30.0	1000	1100	3
Blend B	22/64	100.2	0.463	0.0566	30.2	975	1070	3
Hvy. Dist.	20/64	101.2	0.455	0.0562	30.6	1000	1160	3+
Blend C	22/64	98.3	0.458	0.0582	29.8	966	--	-

What Tests Showed

For the fuels investigated, operation was perfectly satisfactory from the combustion standpoint at standard fuel-rack setting, injection timing, and rated speed. More power was produced by the economy fuels at a higher specific fuel consumption on a weight basis, but at a lower specific fuel consumption on a volume basis. Peak pressures were up to 100 psi higher, and exhaust temperatures were up to 100 deg F higher than those experienced with the 2D type diesel fuel. The cetane number of the fuel did not appear to be significant. In general, the heavy fuels do not perform quite as well as the distillate fuels. There was no significant difference in the amount of smoke produced.

The simplest way to achieve the same power produced by the 2D fuel is to reduce the fuel rate (increase the fuel-rack setting). At the same power level as the 2D fuel gives, the economy fuels perform in the same manner as described above. By altering the basic injection timing, some gains in economy can be realized with all fuels. Depending upon engine-load factors, there is a different combination of fuel-rack setting and injection timing for each fuel that can provide even further gains economy.

There are differences in the performance characteristics of heavy fuels having similar properties, but differing in composition and crude source. A small difference in performance was noted for two fuels from the same crude source but differing in composition while a fuel from another crude source produced larger differences. The performance of this last fuel was contrary to what would have been expected from its analytical properties and points out the desirability of running engine tests on such fuels before drawing any conclusions regarding their performance.

Working on a continuing program covering twelve months, the Boston and Maine turned in and received each month four to six locomotives thus reducing out of service time to a minimum. At left is one of the 15-year-old FT freight units. Above, four of the new General Purpose locomotives are shown on Zoar Curve in Western Massachusetts.

50 new locomotives for old

. . . with a gain of 20,000 horsepower!

The Boston and Maine last year turned in fifty used FT freight locomotives on the purchase of fifty *new* General Purpose locomotives containing certain remanufactured components.

Besides costing considerably less than completely new locomotives, the Boston and Maine gained—from the higher horsepower of each General Purpose unit—a total of 20,000 horsepower, or *the added capacity of eleven additional locomotives.*

How this or similar plans might benefit your road's future can be had in detail from your Electro-Motive representative.

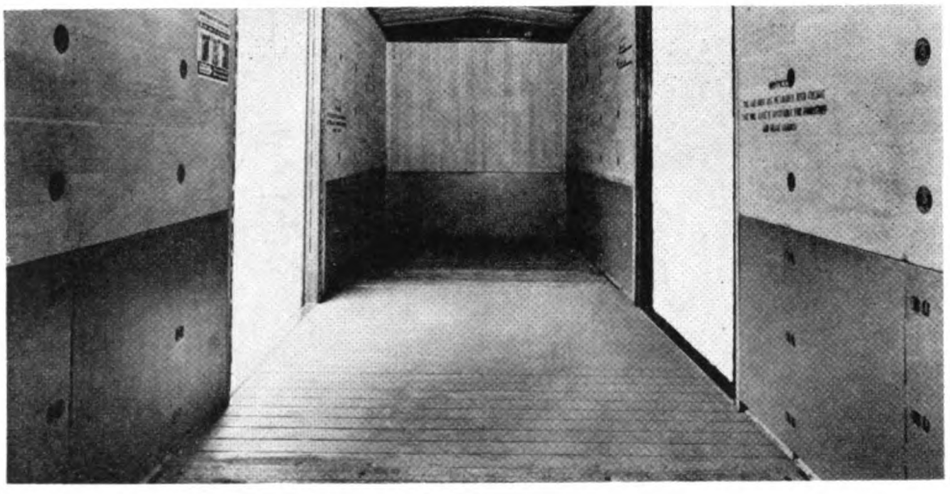
GENERAL MOTORS LOCOMOTIVES

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS

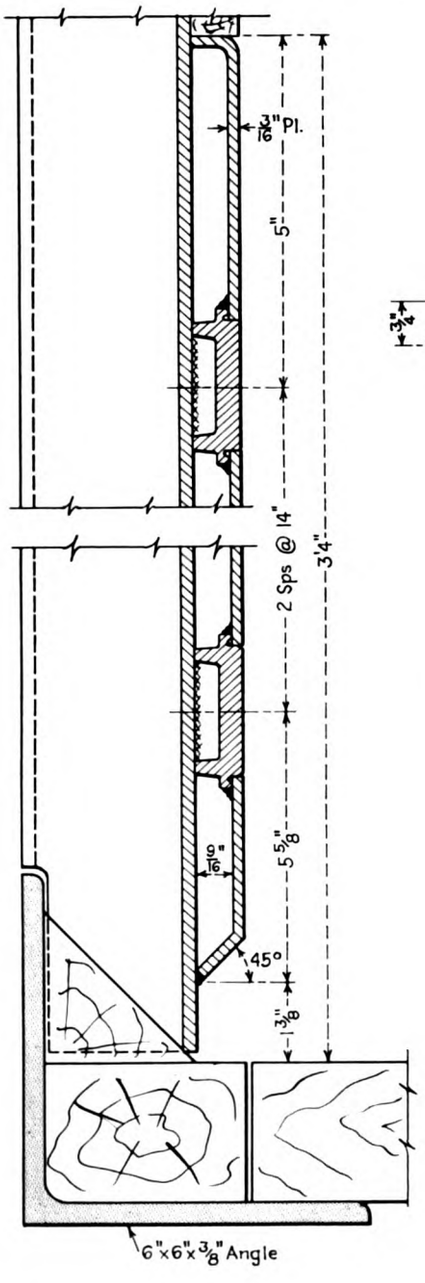
LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*

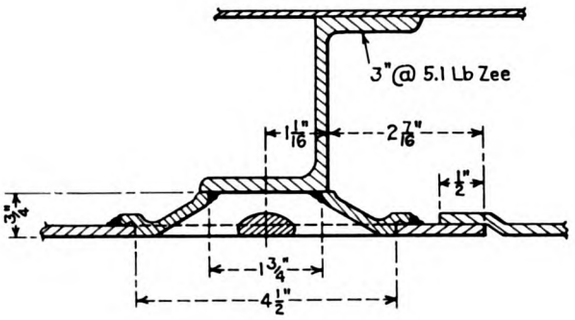
In Canada: General Motors Diesel Limited, London, Ontario

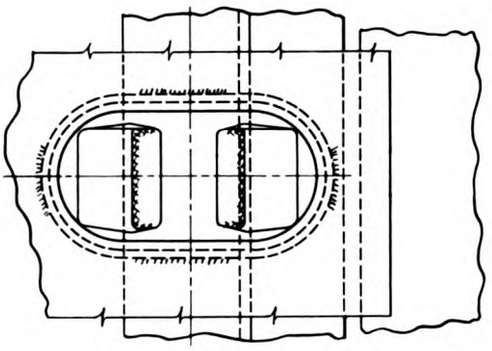
On Its 1,000 Newest Cars . . .



B&O Installs Steel Box-Car Lining







Steel lining and lading strap anchors are combined in the newest B&O cars to make inside surface flush with laminated wood lining used above. The steel lining and steel flooring at the doorway strengthen the car. Inside width is 9 ft 2 in., inside height at sides is 10 ft, and door opening width is 8 ft. These cars have 41.2 lb Z-section center sills. All cars have one-wear wrought steel wheels and 51 have disc brakes.

"NORMALLY there is heavy maintenance with conventional wood lining up to a height of 3 ft above the floor. On these new cars we applied a 3/16 in. steel lining developed jointly by our railroad and the Youngstown Steel Door Company." That's how F. B. Rykoskey, general superintendent motive power of the Baltimore & Ohio, explained the most unique feature of his railroad's 1,000 newest 50-ton box cars.

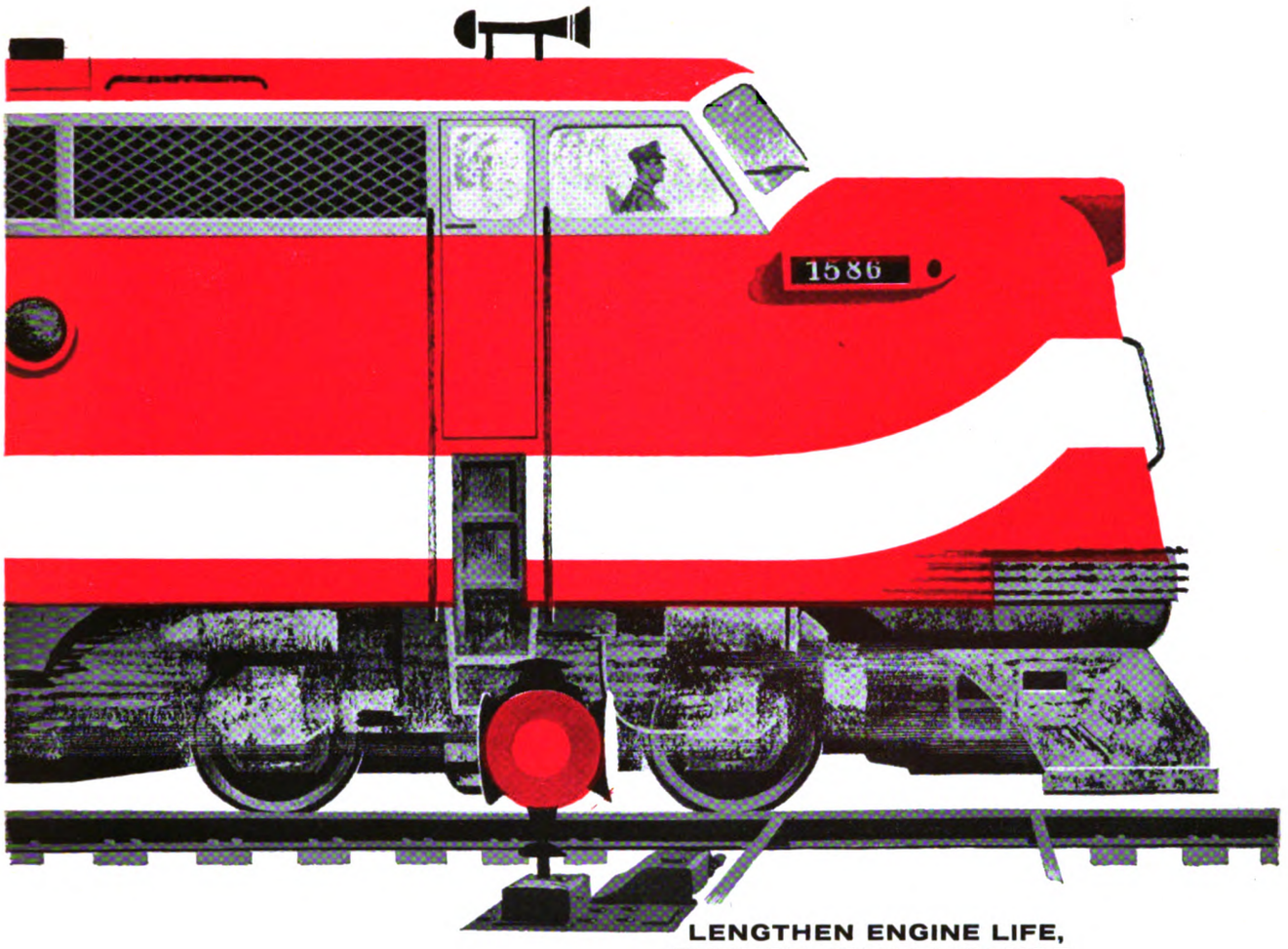
These cars have an inside length of 40 ft 6 in., a door width of 8 ft, and an average lightweight of 48,600 lb. They were assembled at the railroad's Du Bois, Pa., shop late in 1957 and early in 1958. The railroad continued its well established practice of using major subassemblies supplied by car builders. Six hundred sets of body material were furnished by ACF Industries and 400 sets by Pullman-Standard.

Above the 3-ft high steel lining, the railroad used 3/4-in. thick Nu-Loc laminated wood panels furnished by the Weyerhaeuser Sales Company. By using special A Zee lading strap anchors welded behind punched holes in the 3/16-in. steel lining plates, it was unnecessary to use any spacers on the Z-section side posts to bring the surface of the thin steel flush with the heavier wood. Youngstown Steel Door supplied the lining plates, flanged top and bottom, and with the lading anchors welded in position. For application in the car, it was only necessary to weld the anchors to the side posts in the openings through which strapping normally is passed. The lading anchors in the Nu-Loc wood siding are of the conventional MacLean-Fogg type. In the corrugations in the ends of the cars, wooden spacers are used behind the steel lining. To prevent rusting and to protect lading, a non-toxic Neoprene coating was used over the steel lining.

The sides of the car are of welded construction with 5.1 lb, 3-in. Z-sections used as side posts spaced on 3 ft 4 5/16 in. centers. Nailable steel floors are used in the doorway area. Pullman-Standard supplied this flooring for 200 of the cars and the remaining cars are equipped with Stran-Steel flooring. The wood flooring in the ends of all the cars is 2 3/8-in. thick.

The B&O has applied freight car disc brakes to 51 of the cars. Fifty of these are Buffalo Brake Beam's Brake X installations and the other car has an American Steel Foundries Roto-Frate brake.

In addition to reducing maintenance costs, the steel lining should reduce contamination problems. Between all of the side posts the lining sheets form gussets which materially add to the car's strength.



LENGTHEN ENGINE LIFE,
REDUCE MAINTENANCE

Esso Airfil Coating Oil adds outstanding dirt pick-up properties to diesel air intake filters. Airfil protection is so effective that it pays off handsomely in reduced abrasive wear, lowered repair costs, longer engine life. ¶ Airfil also shows superior wicking qualities. Successive layers of dirt and dust are quickly wetted, exposing a fresh, efficient dirt-retaining surface at all times. ¶ Applying Airfil is simple. It goes on rapidly as a hot liquid and cools to a gel-like solid that retains its consistency at engine-room temperatures. And since Airfil is insoluble in water, it stays on the filters, even in the wettest weather. It can, however, be readily removed by a hot detergent wash or a steam blast.

Airfil's cost-cutting advantages make it ideal for passenger car air-conditioner filters too. For further information or technical assistance, call your local Esso office, or contact: Esso Standard Oil Co., Railroad Sales Division, 15 W. 51st St., New York 19, N.Y.

perfected by research . . . proved in performance

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RAILROAD PRODUCTS

N-S-F® Nailable Steel Flooring helps a Progressive Shipper and a Progressive Railroad make safe deliveries

Bowaters Southern Paper Corporation is the largest manufacturer of newsprint in the South. Much of its product is shipped from its Calhoun (Tenn.) mill via the Southern Railway.

Newsprint is a difficult item to ship. If the rolls are scarred or scuffed, torn or dirtied while in transit, damage claims can result. The Southern, living up to its policy of service to shippers, makes certain that boxcars assigned to Bowaters are completely equipped with Nailable Steel Flooring.

Result . . . a satisfied shipper. Every day, 35 boxcars, loaded with newsprint, leave the Bowaters mill. But there has never been a freight damage claim attributable to Nailable Steel Flooring.

"N-S-F is a first class floor for the shipment of newsprint," Bowaters traffic executives agree. "It's always in perfect condition—not too rough to scuff our rolls, not too smooth to cause skidding."

The mutual satisfaction of Bowaters Southern and the Southern Railway with N-S-F means splinter-free flooring that can take any type of lading and can stand up under concentrated fork-truck loads. Its use means less downtime for repairs, more Class A cars in service. No wonder over 60,000 cars have been equipped with N-S-F.

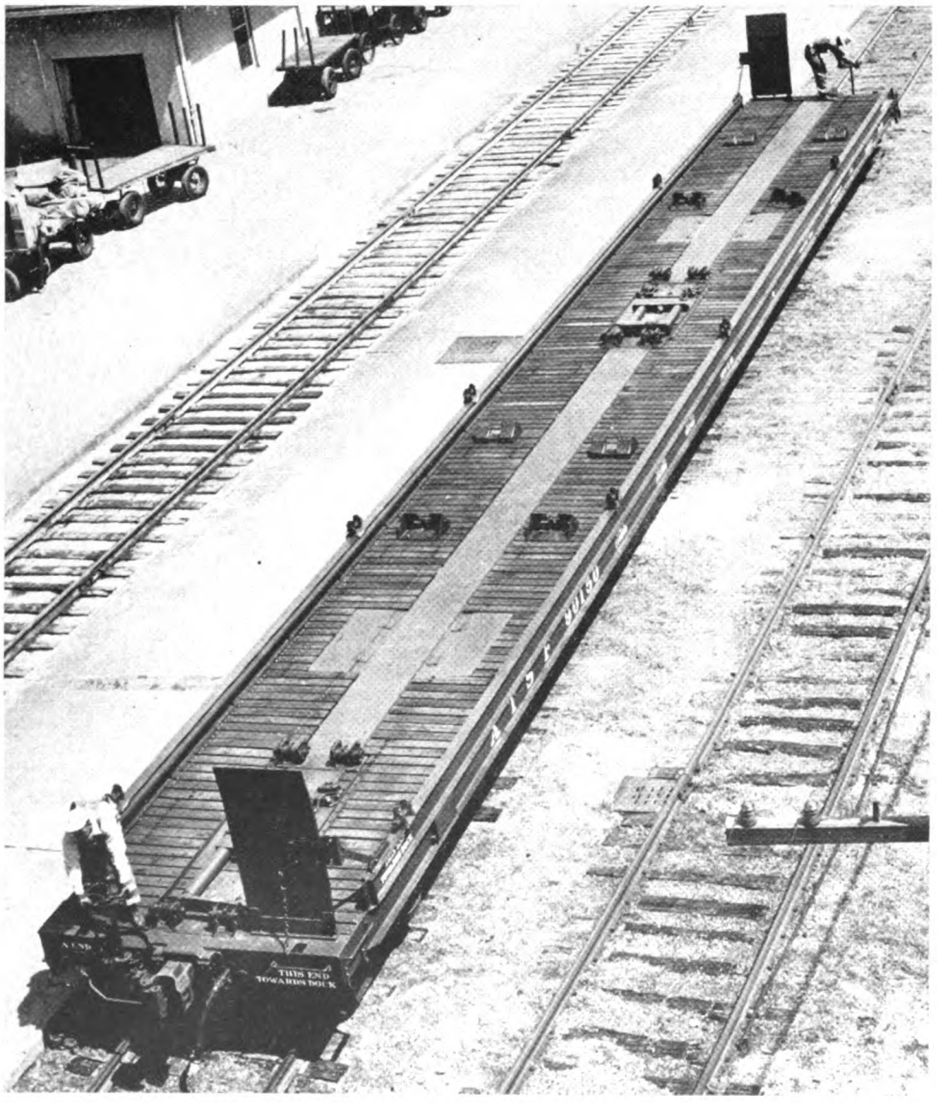
NAILABLE STEEL FLOORING
Originated and sold by—
STRAN-STEEL CORPORATION
Dept. L-23 • Detroit 29, Michigan • Division of
NATIONAL STEEL CORPORATION

Full information and cost studies on the use of N-S-F *in freight cars is readily available from Stran-Steel representatives in Chicago, New York, Philadelphia, St. Louis, Cleveland, San Francisco, Minneapolis and Atlanta. In Canada,* N-S-F *is made and sold by International Equipment Co., Ltd., Montreal.*

This Bowaters Southern fork-truck and its roll of newsprint weighs 5,500 pounds. N-S-F *takes this concentrated load easily—and will for the life of the car.*

BOWATERS
QUALITY
NEWSPRINT
FLAMINEWS
MADE IN U.S.A.

Santa Fe Builds 88-Ft TOFC Cars

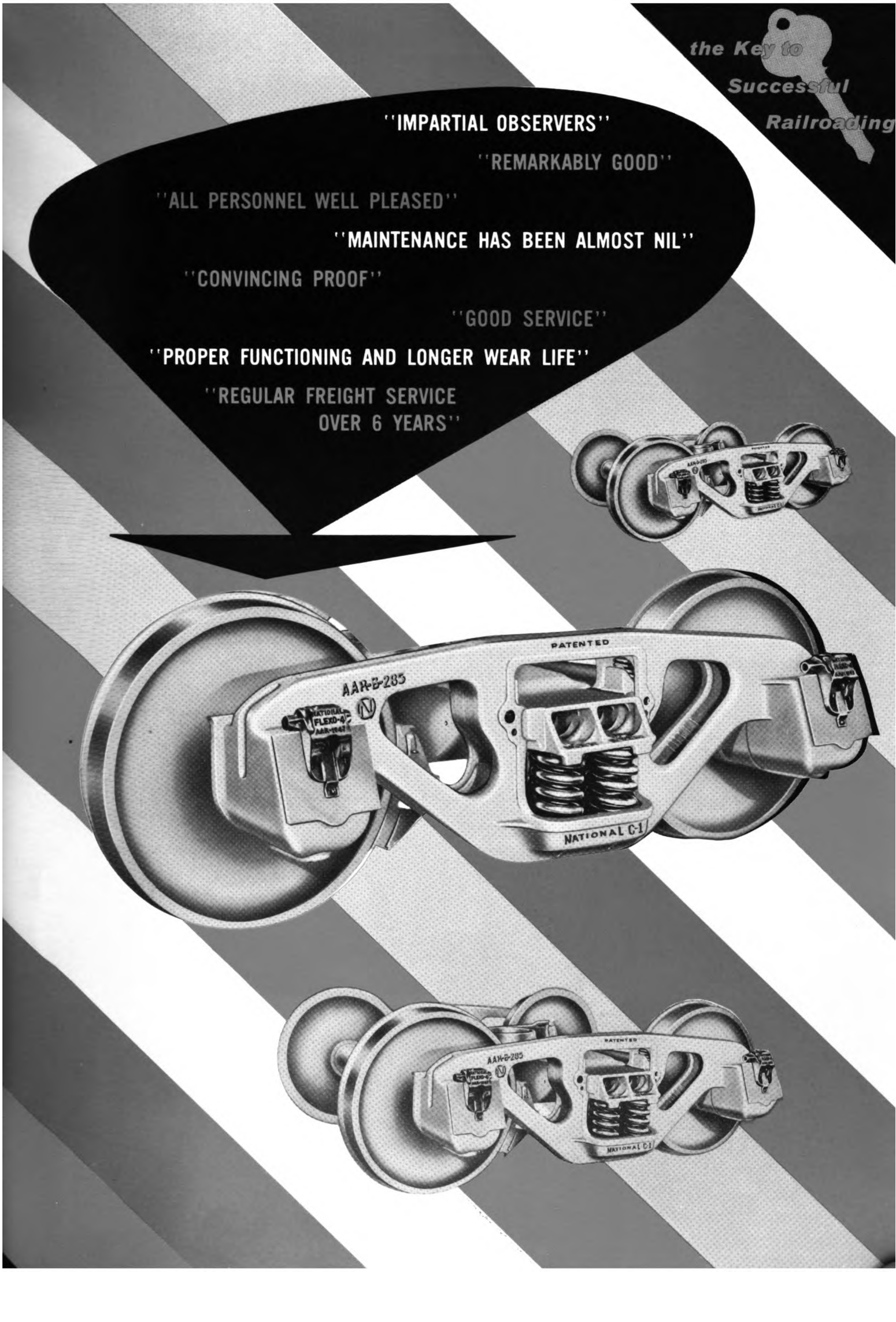


Capacity of these cars is 57½ tons but center load limit is 38½ tons.

THE SANTA FE has recently completed 25 flat cars for piggyback freight service. These are no ordinary flats. The all-welded cars have a loading surface length of 88 ft, an overall width of 9 ft 6 in, and are the longest ever built for TOFC service. They were assembled in the Santa Fe shop at Topeka, Kan.

The center sill is constructed of two 30-in., 132-lb LAHT steel, wide-flange beams. Side sills are 12-in., 35-lb channels, on top of which guide rails are secured. The guides are 10-in. I-beams, having 3-in. pipe welded to the webs to protect the trailer tires. The Ride-Control trucks have springs with 3 11/16-in. travel Unit brake beams, one-wear wrought steel wheels, and ABS cartridge bearings for the 6 x 11 journals. The trailer hitch is designed for attachment to the trailer king pin and is located to accommodate two 40-ft trailers with refrigerator units attached to the front ends or any combination of two smaller trailers in present day service. Cable and shock absorber tie-down devices have been tested to hold trailers loaded with 45,000 lb.

Special features of these 88-ft cars include long-travel rubber draft gears, swivel couplers and dual AB brakes. The two hand brakes are the drop shaft type. Even with the hand brake wheel flush with the top of the deck in the down position, the brake can be operated. Four tool and equipment storage boxes, with hinged lids, are located between the center and side sills below deck, two at each end of the car. The truck centers are 76 ft, and the height from the top of the rail to the top of the oak deck is 3 ft 5/16 in. This deck is depressed to make it level with the top of the center and side sill sections. The light weight of the car is 93,200 lb.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Successful
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"IMPARTIAL OBSERVERS"
"REMARKABLY GOOD"
"ALL PERSONNEL WELL PLEASED"
"MAINTENANCE HAS BEEN ALMOST NIL"
"CONVINCING PROOF"
"GOOD SERVICE"
"PROPER FUNCTIONING AND LONGER WEAR LIFE"
"REGULAR FREIGHT SERVICE
OVER 6 YEARS"
PATENTED
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NATIONAL FLEXI-G
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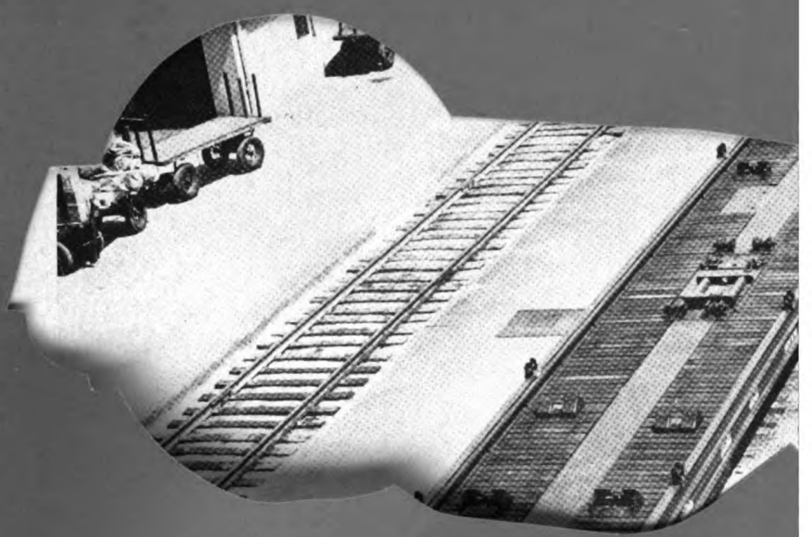
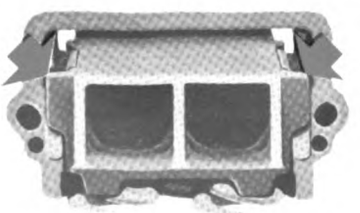
INSPECTIO
HAVE LONG

Specially hardened spring steel wear plate is welded to bolster. Large flat bearing area reduces wear.

Special hardness ratio
and bolster contact fa
maximum wear resista
and plate.





Stability of bolster, resulting from friction control mechanism, is indicated by little contact between side frame column wear pad and bolster column lugs.

Low-stressed wedge spri
pretempered wire, cold-
peened for long life.

THAT NATIONAL C-1 TRUCKS

the Key to Successful Railroading

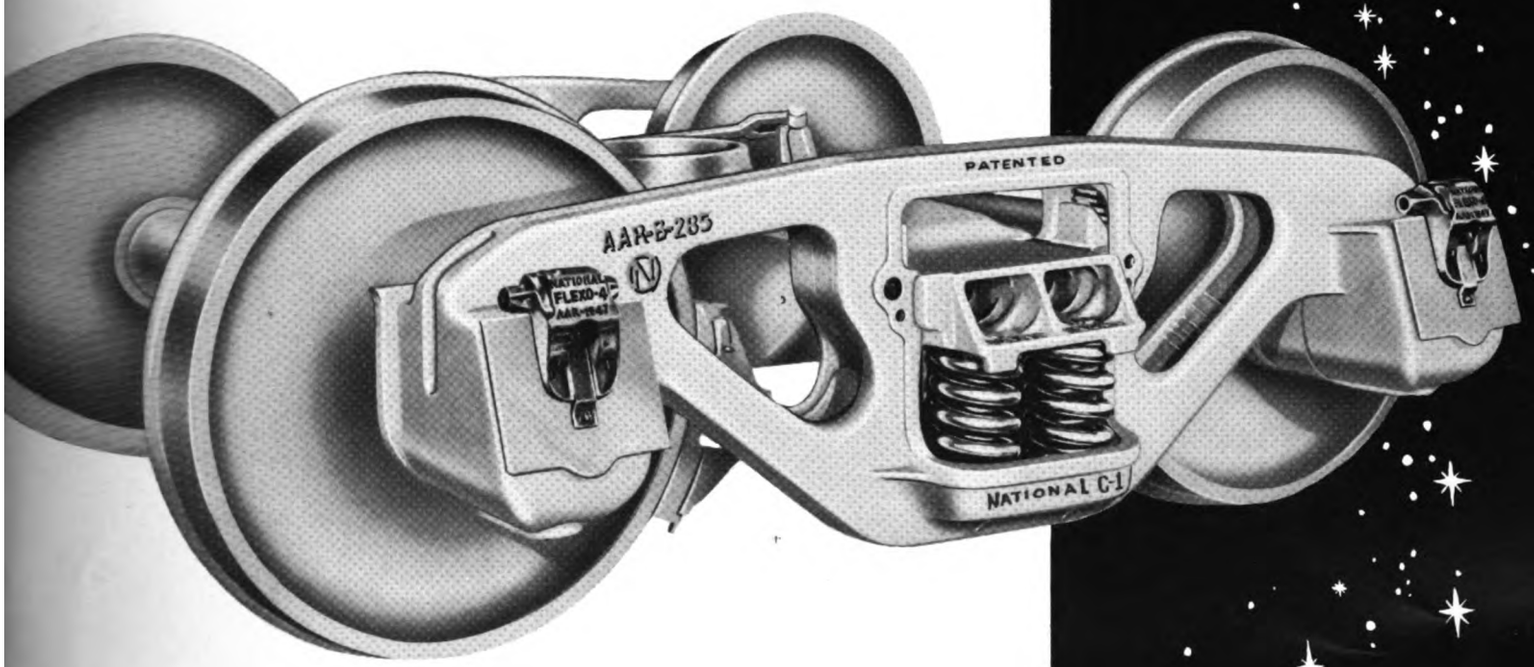
NATIONAL SPECIALTIES

The heart of a smooth-riding freight car is the friction control mechanism of the truck.

Users have known for years that National C-1 Trucks provide this smooth, friction-controlled ride. And they also know that National C-1 Trucks have longer wear life.

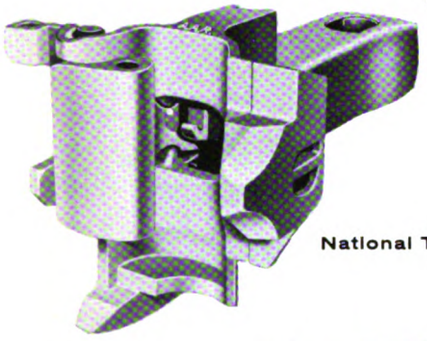
A recent control mechanism inspection, by a group of impartial railroad men, was performed on a group of C-1 trucks that had been in service for over 200,000 miles. This, and other inspections, indicate that *the friction control mechanism in National C-1 Trucks is designed for the life of the car.*

AA-7481

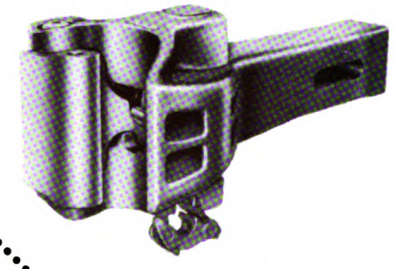


The Railroads are Moving Ahead . . .

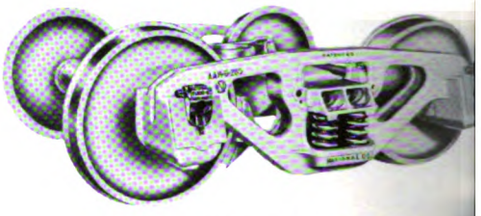
with these NATIONAL SPECIALTIES



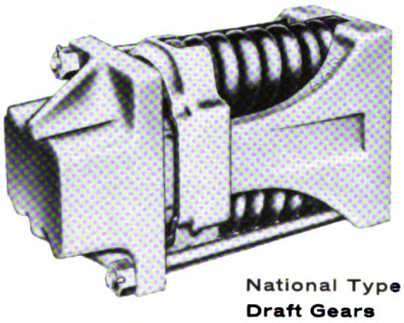
National Type F Couplers



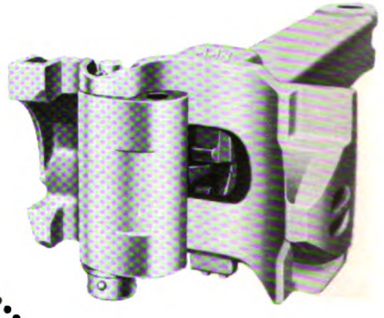
National Type E Couplers



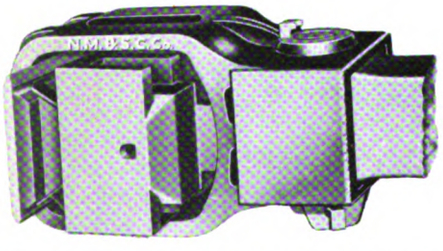
National C-1 Trucks



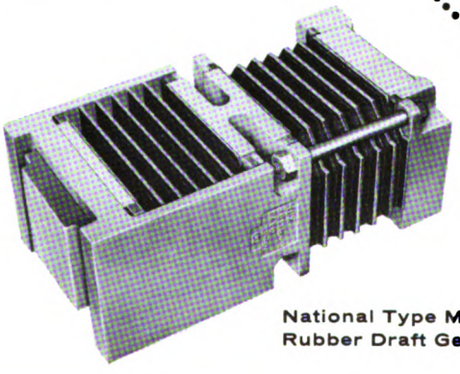
National Type M-17-A Friction Draft Gears



National Type H Tightlock Couplers



National Type M-380-A Diesel Rubber Draft Gears



National Type MF-400 Rubber Draft Gears

NATIONAL MALLEABLE and STEEL **CASTINGS COMPANY**

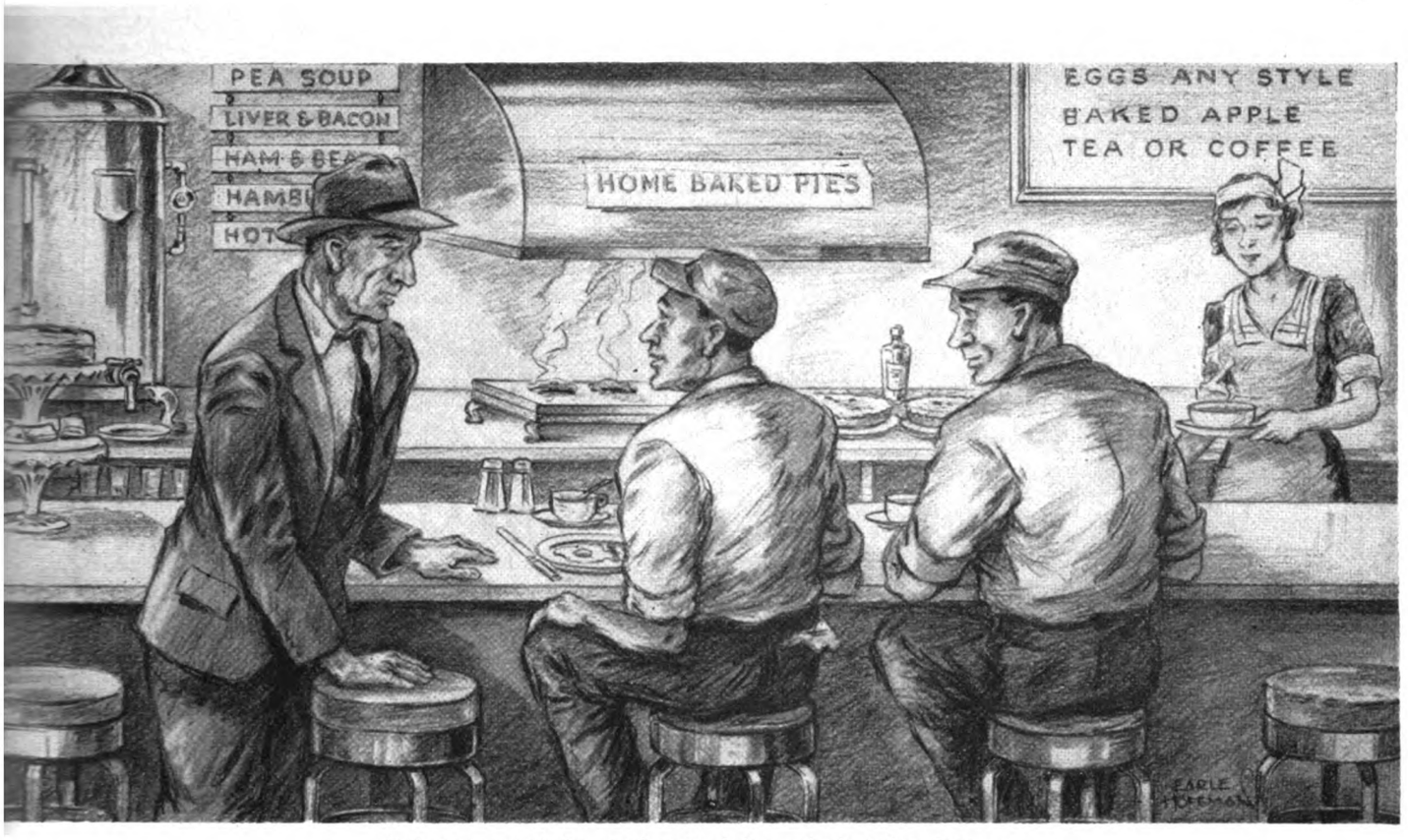
Established 1868

Railway Division Headquarters
Cleveland 6, Ohio

International Division Headquarters
Cleveland 6, Ohio

CANADIAN SUBSIDIARY

National Malleable and Steel Castings Company of Canada, Ltd. • Toronto 1, Ontario



At that moment, Big Jim, the boss, hustled up and asked where Pete was.

'The Engine Stopped'

By Ken Wright

TONY AND MIKE began eating their nches together after they had made ıch a foolish mistake while trouble ıooting a mechanical refrigerator car. car—reported as a failure—had ac-ıally been out of fuel, and Tony and like had failed to notice this. Now ıey enjoyed these lunch-period sessions. seemed their mutual mistake had de-eloped a comradeship based on that vent. Mike was saying, "I sure didn't ıink that Pete could make these me-ıanical refrigerator cars so damn easy) understand. He usually does nothing ut complain. But, suddenly he's a retty good instructor."

Mike was referring to the short class essions that Pete was holding once a eek at the beginning of the work day. 'ony agreed. At that moment Big Jim, ıe boss, hustled up and asked where Pete was. Mike told him that Pete had driven home during his lunch period. "Well, in that case," said Jim, "I guess you fellows will have to give the mechanical refrigerator cars another whirl. I hope you don't fall down again—and I don't think you will. One of the inspectors at the yard just called in to say that PREX 857 had its engine running when he first got to it, but that the engine stopped while he was there. Car's on Track 5 near the east end. You two go over. If you can't fix it right away, call me and I will have the car cut out of that train."

On their way to the car, Mike and Tony said nothing. Each was thinking about what would happen if they failed again. Finally Tony said: "Do you remember what Pete said that first day he held a class? 'Don't make a hard job out of a simple one.' Let's check the simple and easy things first."

Upon arrival at the car, the first thing they did was to check the fuel tank. It was two-thirds full. Next they checked to see what type of equipment was installed in the car. Painted up over the machinery compartment was *Thermo-King.*

"Say, Mike," Tony exclaimed, "isn't that the type of equipment that Pete was telling about the other day?"

"You mean," replied Mike, "the one that operates on kerosene and is not a diesel but a spark ignition engine? It drives the compressor direct without any electric system."

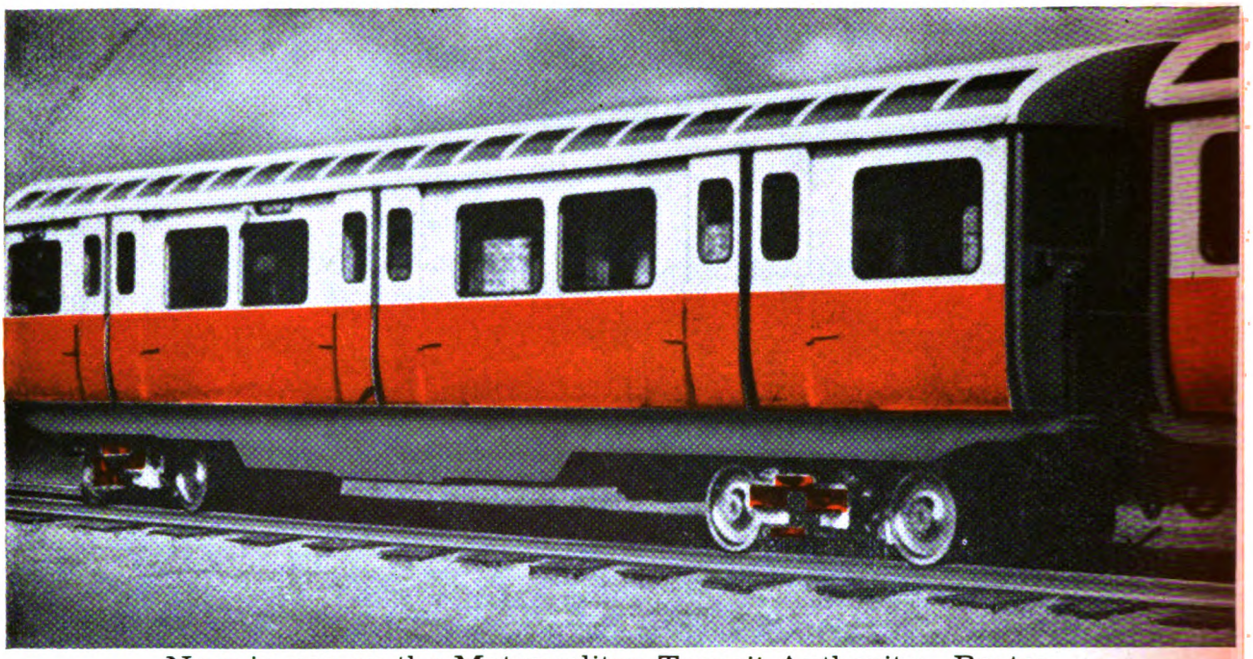
Tony agreed and continued, "Some Thermo-Kings were developed for butane or gasoline. On all of them, thermostats stop and start the engines."

"Wait a minute, Tony," Mike cautioned, "Pete also said that Thermo-King has a later unit with a diesel engine that does not stop, but cycles down to a lower speed when the car temperature is lowered to the thermostat setting."

With that, Tony went back to the fuel tank. It was labeled *Kerosene.* They then opened the inspection door and there was the Thermo-King unit. The engine had a spark ignition system. The thermometer stood at 38 deg. A look at the log book showed that the car was

(*Continued on page 58*)

This is the fourth article in this series, discussing ıe operation, maintenance and trouble shooting f mechanical refrigerator cars.



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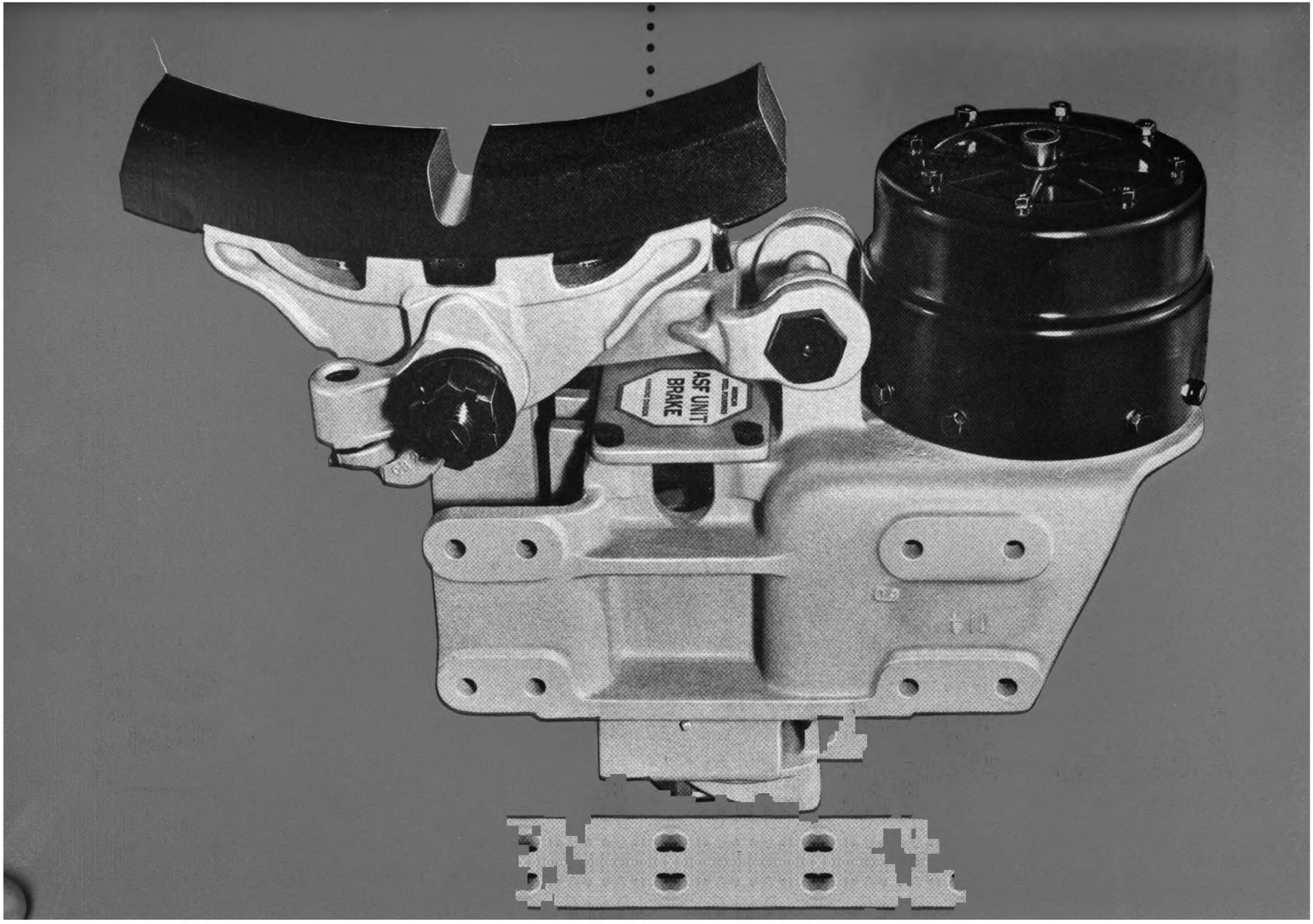
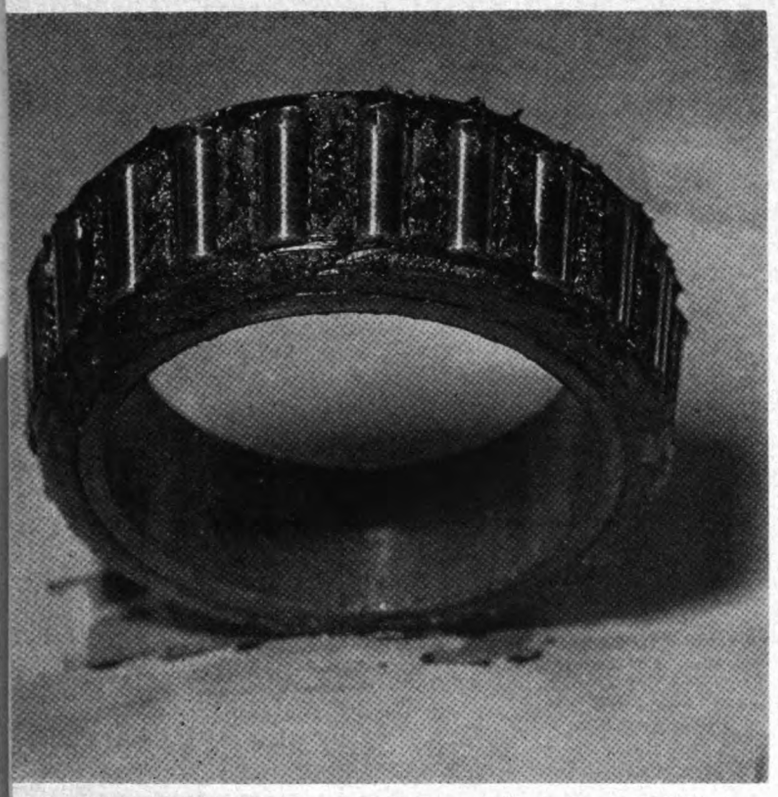

ASF UNIT
BRAKE



Grease remains in cone and roller assembly of car SP-510005 after disassembly following 36 months of service. Two package bearings in this car which were inspected and weighed still held 6 oz and 4 oz of the original 15 oz of grease. After inspection, all bearings went back into service.

For Roller Bearings . . .

SP Tests Extended Re

SEVEN SOUTHERN PACIFIC TOFC cars have operated for over three years without the addition of any lubricant to their package roller bearings. The AAR Committee on Lubrication referred to this test in its report to the recent annual meeting of the Mechanical Division which said, "While leakage did occur, the bearings which were disassembled were in excellent condition after 36 months." The Committee went on to say that it is studying the possibility of extending the relubrication period for grease-lubricated roller bearings from the present mandatory 18 months to 36 months. (RL&C, July 1958, p. 30).

During the first quarter of 1955, the Southern Pacific equipped ten 70-ton flatcars in TOFC service with Timken 6 x 11 in. Heavy Duty AP roller bearings. These Timken roller bearing assemblies were applied to integral-box side frames which were altered only by cutting off the front portion of the journal box perpendicularly back of hinge lug.

These cars were
Texas Company's No.
sistency grease, one of t
approved lubricants.

Because AAR In
66-A, Paragraph (a), t
grease-lubricated roller
used in interchange se
and lubricated each 1
sequently changed to 1
tive January 1, 1958),
brought into the Los
Shops on February 14
tain the condition o
lubricant, side frames
tinent parts of the truc

The truck at the "B
was dismantled, and th
removed with a pulle
of the bearings and
cleaned of accumulated
ings and caps were we
then thoroughly purged
reweighed. The differer
used to determine ex
grease had been consu

roller bearings on the "A" end truck since their original application on February 17, 1955. This truck was dismantled, and the roller bearings removed. The bearings and end caps were first cleaned of accumulated exterior dirt and then weighed. After being thoroughly purged of all grease, they were reweighed. The difference in weight was again used to determine exactly how much grease had been consumed. The grease consumption of the four bearings during the two-year period had been as follows: R-4 position—2 oz; R-3—none; L-3—5 oz, and L-4—3 oz. The bearings, wedges, wheels and other truck appurtenances were found to be in excellent condition with no undue wear or defects.

As each of the other nine cars completed its two years of operation, the stenciling was changed by adding the figure "3" in front of the word "LUB" and substituting of "57" in place of "56." The trucks and bearings were not disturbed, and no lubricant was added.

Because the truck at the B end of car SP-510145 had been inspected at the end of one year's operation and the truck at the A end of this car inspected at completion of two year's operation, cars SP-510117 and SP-510005—both of which had been operated in similar service—were shopped in Los Angeles on February 25, 1958. The roller bearings were inspected after having completed 36 consecutive months of service without the addition of any grease and after operating approximately 216,000 miles in the three-year period.

Inspection was made in the presence of Mr. A. J. Schulte, lubrication supervisor, Atchison, Topeka & Santa Fe; Mr. M. A. Pinney, engineer of tests, Pennsylvania, chairman and vice chairman, respectively, of the AAR Committee on Lubrication of Cars and Locomotives. Other members of the Lubrication Committee present at the inspection included Mr. Frank Fahland, general mechanical engineer, Union Pacific; Mr. Wayne Lasky, engineer of tests, Gulf, Mobile and Ohio, and Mr. L. N. Griffith, assistant mechanical engineer, Southern Pacific.

Grease removed from these bearings was found from laboratory analysis to be in good condition considering the extended service period and absence of any make-up grease. In view of this, the SP is going to run the remaining seven cars for another year, or to wheel change, (whichever comes first) without the addition of any grease to the journal bearings.

Marks on outer races indicated that the bearing package had "crept" under the adapter as it was designed to do. There was no significant wear.

Integral box side frames were altered to make the bearing application on these ten SP piggyback cars. Front of the box was burned off.

Inspection of 6 x 11-in, AP-type Roller Bearings on 70-ton Piggy Back Cars

Lubricated with "O" Consistency Grease
Los Angeles, Cal., February 25, 1958

Car Number	510117	510117	510005	510005
Months of Service	36	36	36	36
Approximate Mileage	216,000	216,000	216,000	216,000
Wheel Position	R-3	L-3	R-4	L-4
Housing Cleanliness	Moderately dirty and dry	Moderately dirty and wet	Moderately dirty and dry	Moderately dirty and dry
Original Lateral (in.)	0.006	0.005	0.003	0.003
Present Lateral (in.)	0.007	0.005	0.0075	0.003
Weights:				
Bearing and Grease (lb-oz)	48-12½	48-12	48-11	48-9
Dry Bearing (lb-oz)	48-5	48-5	48-5	48-5
Remaining Grease (oz)	7½	7	6	4
Grease Originally Applied (oz)	15	15	15	15
Grease Consumed in 36 mos (oz)	7½	8	9	11
Grease Consumed (per cent)	50	53	60	73
Wear of Back Seals	Moderate non through for 90 deg	Severe, non through for 210 deg	Excellent	Severe, through for 180 deg
Wear of Front Seals	Very slight, non through	Excellent	Slight, non through for 45 deg	Severe, non through for 210 deg
Wear of Seal Wear Rings	Very slight	Very slight	Very slight	Very slight

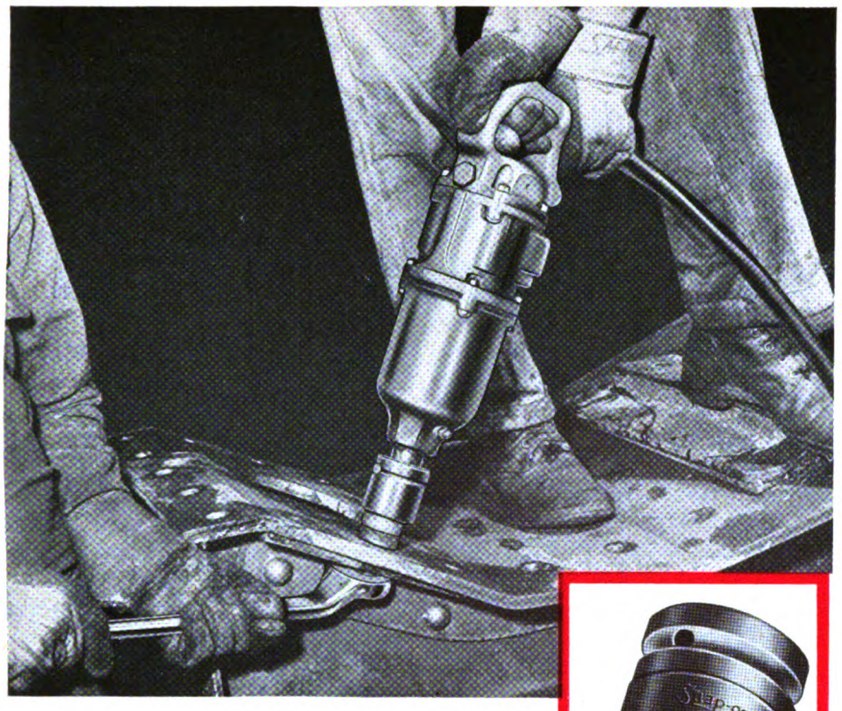
Notes on the Test

Condition of Grease: In each case the grease was very dark and well worked with no visible change in consistency or contamination.

Lubrication: In each case the lubrication appeared excellent and well distributed through the bearing.

The seals were pressed out of the outer race of one AP bearing in order to make an examination of the bearings by the members of the AAR committee present. The condition of the bearings was found to be very satisfactory. On the following day in the presence of L. N. Griffith (representing the AAR Lubrication Committee), the seals were pressed out of five other AP bearings which had been inspected by the entire committee the previous day. The condition of these bearings was found to be very satisfactory and similar to the first one examined. The outside diameter surface of the outer races showed no wear; it did show that the outer races had crept through 360 deg as evidenced from contact marks with the adapters.

Four sets of wheels were dropped from these two cars for the bearing inspection. Three sets of wheels were replaced with new wheels at this time because remaining wheel life would have required replacement at an early date. Bearings on these three wheel sets have run from wheel application to wheel removal without lubricant addition or bearing replacement. The cars are equipped with multiple wear freedom passenger car wheels which had been turned down for freight service.



Tips to help you cut impact socket breakage

- Position power wrench so that socket fits straight on nut. Tilted wrench causes binding and socket breakage.
- Use right size socket . . . replace worn or undersize nuts. Loose-fitting sockets wear faster — then break.
- Don't keep impacting after nut is tightly set. This causes needless wear on both wrench and socket.
- Keep the inside of sockets clean. Dirt and grease are common causes of socket breakage.
- When power wrench drive head becomes worn — replace it. Loose drive causes excess wear in socket drive opening — early socket breakage.

Best tip yet!

ALWAYS USE Snap-on INDUSTRIAL SOCKETS

Sockets used on power nut runners and impact wrenches take a terrific pounding. Standard hand-wrench sockets are not designed for this work. *Snap-on* heavy-duty industrial sockets have the extra heft and toughness to take the beating. Result: more work-hours per socket and, equally important, less costly downtime resulting from frequent breakage of ordinary sockets.

Final tip. Talk sockets with your *Snap-on* railroad specialist. Take advantage of his tool knowledge, and his competent advice on what is best for you in the wide range of *Snap-on* sockets for railroad use.

Write for complete information.

SNAP-ON TOOLS
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Railroad Division
8130-I 28th Avenue • Kenosha, Wisconsin

'The Engine Stopped'

(*Continued from page 53*)

loaded with fresh eggs, and the thermostat was set for 38 deg. All this meant that there was nothing wrong with the equipment.

The engine had stopped when the temperature of the car had gotten down to the thermostat setting. When the car's temperature did go up, the engine would be cranked automatically. When it started, the car would again begin cooling.

While the log book was out, Tony filled in their routine inspection. They had some difficulty in knowing just how to make the report when the engine was not running. They decided that the best they could do would be to check oil, water and general condition, then make a note that the engine had cycled off.

While Tony was closing the doors and resealing the compartment, Mike went to the phone and called Jim.When the two met, Mike was laughing. "Big Jim was fit to be tied when I told him there was nothing wrong. I told him that we would explain when we got back. I'm hoping that Pete will be around to back us up."

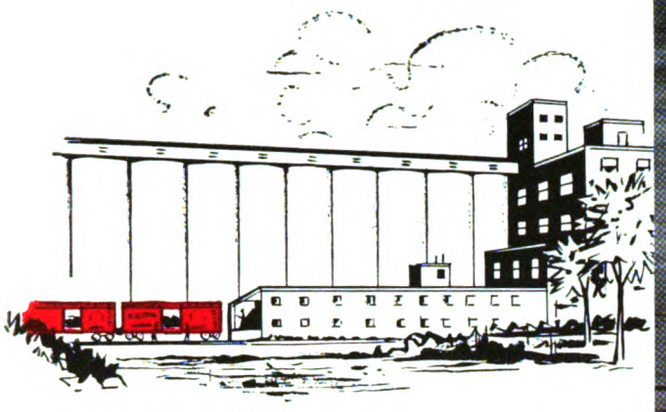
When they did get back to the shop, Jim met them with, "What do you mean there wasn't anything wrong? The engine wasn't running was it?"

They explained to him that this type of equipment was different than others —that the engine cycled on and off automatically. While they were explaining this, Pete walked up and listened. When they had finished, Pete verified all that they had said.

"Do you mean, then," Jim asked, "that listening for the engine to be running or stopped on any refrigerator car is no assurance that the equipment is operating or has failed."

"Of course not," Peter replied. "On these Thermo-Kings, the engine stops and starts. In fact, if the car is equipped with two units— which they are in some cases—one engine might be running and the other stopped. On other systems where a diesel engine generates electric power, the engine might be running, but still the rest of the equipment could have failed. There could be tripped circuit breakers, defective relays, defective wiring, or all sorts of other troubles."

The group broke up. "Over and over again," Pete mumbled to himself, I told them all about this at the session only the other day, and that had to be the day that Jim was away. Now I have to tell him the same story." Pete still was not happy; probably never would be.



Here is evidence of the results you get with AD boxcars. Top picture is before treatment.

Minneapolis & St. Louis Railway reports:

8 to 10 Extra Flour Cars every day with ADM Freight Liner 810

Smooth, tight interior with full sanitary protection is shown i picture. The finished job dried in minutes.

Sacked flour must be shipped in boxcars with clean, smooth linings . . . free from rough or broken areas, grease and oil stains. The flour millers in Minneapolis have trouble getting enough top grade cars; rejections run high.

The Minneapolis & St. Louis Railway Company, using the ADM Freight Liner System, has substantially increased the number of flour cars it supplies to Minneapolis mills. The M • St. L. is now providing eight to ten *extra* flour cars each day . . . eight to ten *extra revenue* cars. And it has not had a single Freight Liner-treated car rejected.

Like 30 other U.S. railroads that have upgraded more than 80,000 cars with Freight Liner in the last two years, the Minneapolis & St. Louis finds Freight Liner ideal when sealed, smooth interiors are a must.

The plastic-and-fiberglass treatment seals rough or broken walls and corners with a smooth, tough surface that is moisture-proof and easy to clean. And the plastic alone seals off oil and grease spots. The Pure Food and Drug Administration approves ADM Freight Liner 810 for shipment and storage of foodstuffs.

Let ADM technical service personnel show you how economical and easy-to-apply Freight Liner can solve your high-grade lading problems. For a demonstration on your cars, write, wire or phone ADM Freight Liner System, Archer-Daniels-Midland Company, 700 Investors Building, Minneapolis 2, Minn. (Federal 3-2112).

Archer-Daniels-Midland

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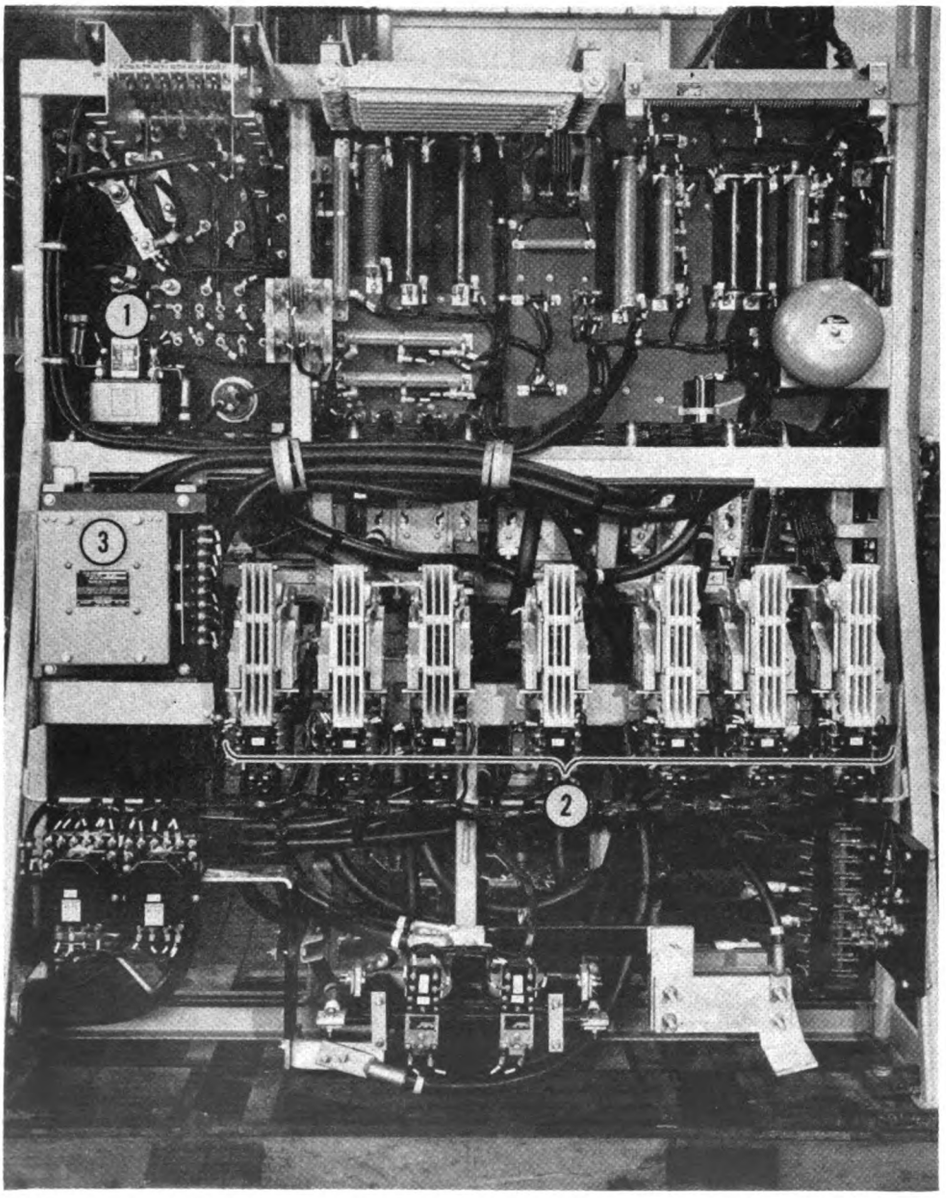
EMD Goes to All-Electric Control

GM diesels are now getting magnetically powered contactors which take the place of the traditional pneumatic switch gear

A MAJOR CHANGE in the control of diesel locomotives produced by the Electro-Motive Division of General Motors has resulted from work done over the past five years. The newest EMD units are being fitted with all-electric traction control systems. Until now, traction control has been based on pneumatically operated contactors.

In 1952, the electrical engineering section of EMD was assigned to the redesign of the control equipment on GM locomotives to reduce maintenance costs and road failures. Undesirable features were to be eliminated. Maintenance and repair of electrical equipment were becoming major factors in locomotive maintenance costs. As one EMD spokesman put it, "We have had our share of troubles with diesel power from the beginning—big and little troubles. As the various sections worked out their problems with engines and related accessories, the major difficulties began to disappear. Minor troubles in the electrical system became major headaches. Something had to be done."



Engine side of new GP-9 control rack has (1) starting contactors, (2) power contactors, and (3) field shunting contactor assembly, all of the new design.

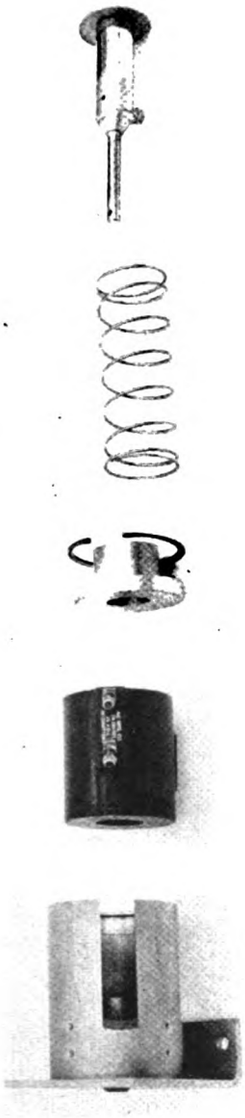
Too many failures and costly delays were caused by loose and lost bolts and nuts. Other road failures resulted from fraying of braided shunts—most always one wire at a time, and the wearing of copper contacts in non-enclosed interlocks caused by abrasive dirt and the sliding action. Many electrical equipment designs, taken from industry where equipment was stationary and load factors were different, proved inadequate when applied to diesel locomotives.

Vibration due to mobility and restricted space were major problems. From the time the first EMD diesel locomotive was turned out, there always have been requests from railroads for changes requiring additional control functions. One increment after another was added. For instance, the original wheel slip indicator and its modifications, and the evolution from manual to automatic motor transition. It became a question of making the control cabinets larger or the components smaller.

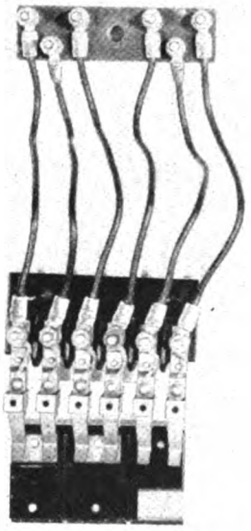
It was decided to design with a goal of six year maintenance cycles. The new components would have to be simplified, lighter in weight, easier to apply, protected from the elements, and capable of being replaced as a unit, if possible.

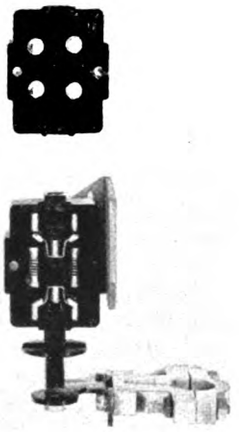
One of the first items was the interlock, an auxiliary low current contact used in control circuits to reflect the position of the main contacts of a power contactor. Here was a fertile field for improvement. About anything that could

Basic Features Make New Equipment Possible . . .

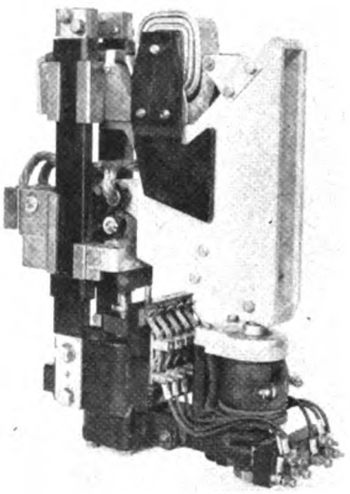


Coil and magnet frame assembly is key to entire development; equals air cylinder in performance.

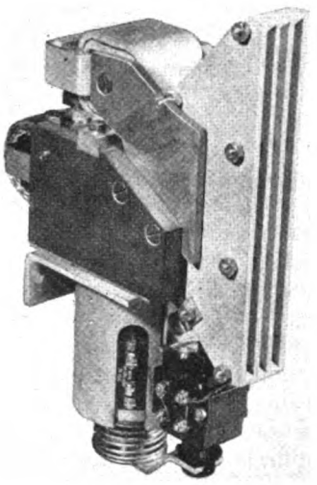




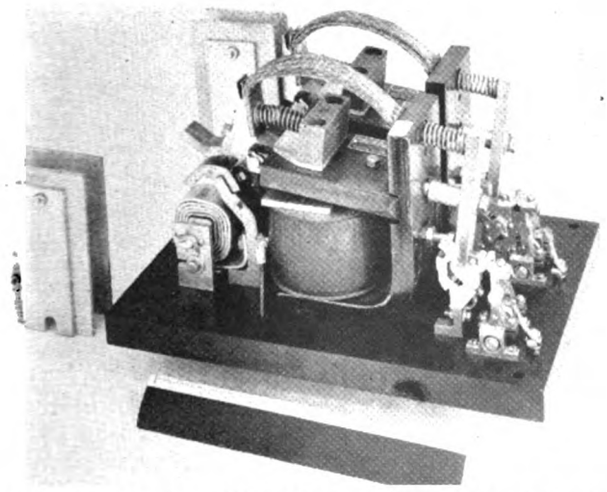
Interlocks as redesigned do not require flexible leads and are completely enclosed to exclude dirt from contact surfaces.



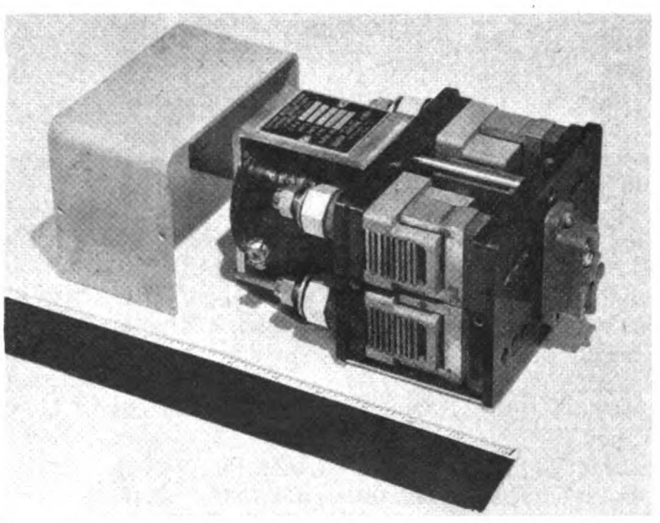
Familiar old-style power contactor has open interlocks back of magnet valve under arc chute.



New power contactor design has enclosed interlock assembly mounted at the front of the device.



Old style engine starting contactor has braided shunts and open interlocks. Solenoids and contacts are bulky. Such starting contactors have been the source of some road failures.



New style engine starting contactor is half the size of former standard and now has completely enclosed interlocks. Its operation is expected to be comparatively trouble-free.

happen to a piece of equipment happened here—dirt, loose connections, loose bolts, loose nuts, frayed shunts, and sliding contacts on copper surfaces. All were potential troublemakers. Specifications for the new interlock required that it (1) be totally enclosed, (2) be designed to eliminate sliding action, (3) eliminate copper as a contact or interrupting surface, and (4) have specific alloys for special purposes.

Requirements like these also entered into the redesign of the power contactors. For example, a silver cadmium alloy, about ⅛ in. thick, is brazed on the copper contacts to handle 1,000 amp for the D-47 motor of a GP-9. Alloy contacts, although they erode and oxidize, still remain good conductors because line or point contact areas carry the load. A perfectly machined contactor is not feasible, because of its cost and because it does not come open readily.

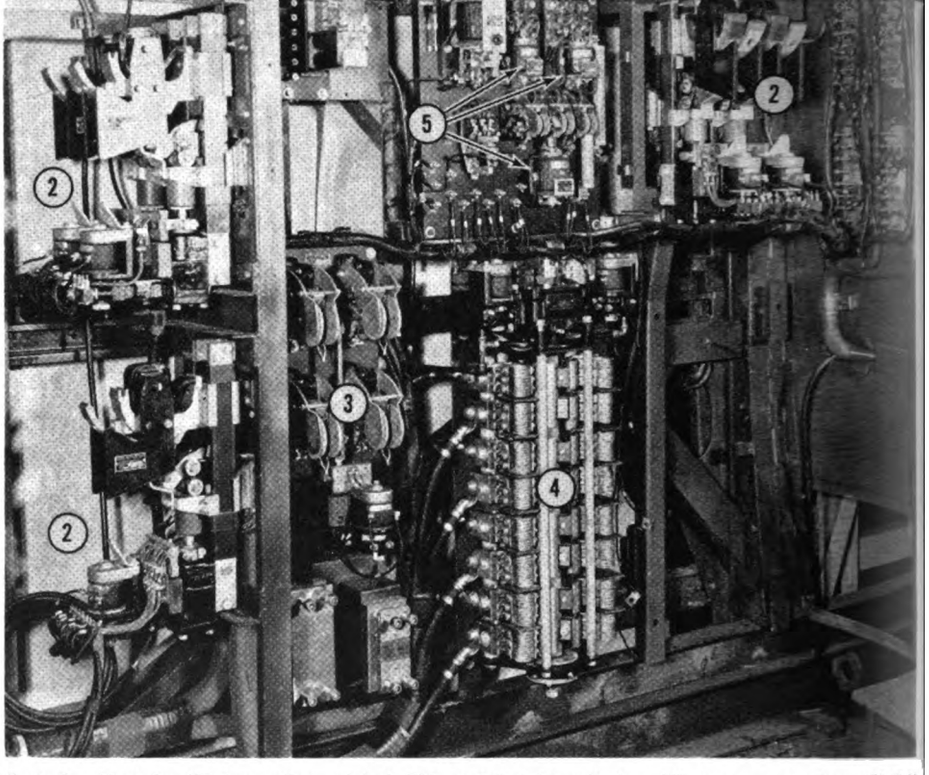
The engine starting contactor was bulky; and it had braided shunts, copper contacts and exposed interlocks subject to dirt. The new model is half the size and the interlocks are totally enclosed. Contacts are now made of a silver alloy.

One basic design of contactor takes the place of the separate types formerly used for the battery field, shunt field, and battery charging contactors. The battery field contactor makes and breaks the circuit (60 amp maximum) to the generator battery field; and the battery charging contactor makes and breaks the circuit (225 amp maximum) from the auxiliary generator to the battery. The shunt field contactor makes and breaks the generator shunt field circuit.

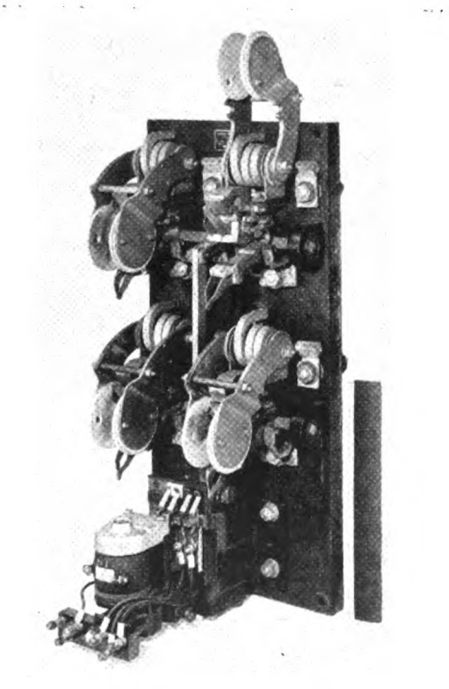
Application of an additional bus bar and a special arc chute places the contacts in parallel on the battery field contactor. The contacts are in series on the shun field contactor. The size of these alloy contacts varies with the current to be carried. All interlocks are enclosed.

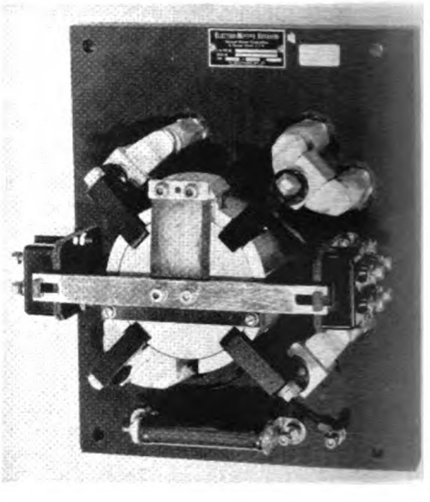
The four-pole, motor field shunt contactor gave a lot of trouble. It's function is to shunt part of the motor field current through resistance to increase locomotive speed. The copper contacts used had to be changed constantly by railroads. Oxidation of the copper would cause high resistance through the contact. The sliding finger interlocks were exposed and the air cylinder was subject to leaks.

Malfunctions occurred in cold weather, particularly because the packing seal around the piston rod needed frequent lubrication. Under extremely cold conditions, the lubricant could congeal so the piston would not move. It was rather common to place lighted fuses in the control cabinets to keep them warm. Flexing during the opening and closing of the contactor broke the braided shunts.



Control cabinet for FT locomotive, original GM road freight unit, has (2) power contactors, (3) field shunting contactors, (4) reverser, and (5) shunt-field, battery-field, and battery-charging contactors. Cam switch is in separate cabinet.

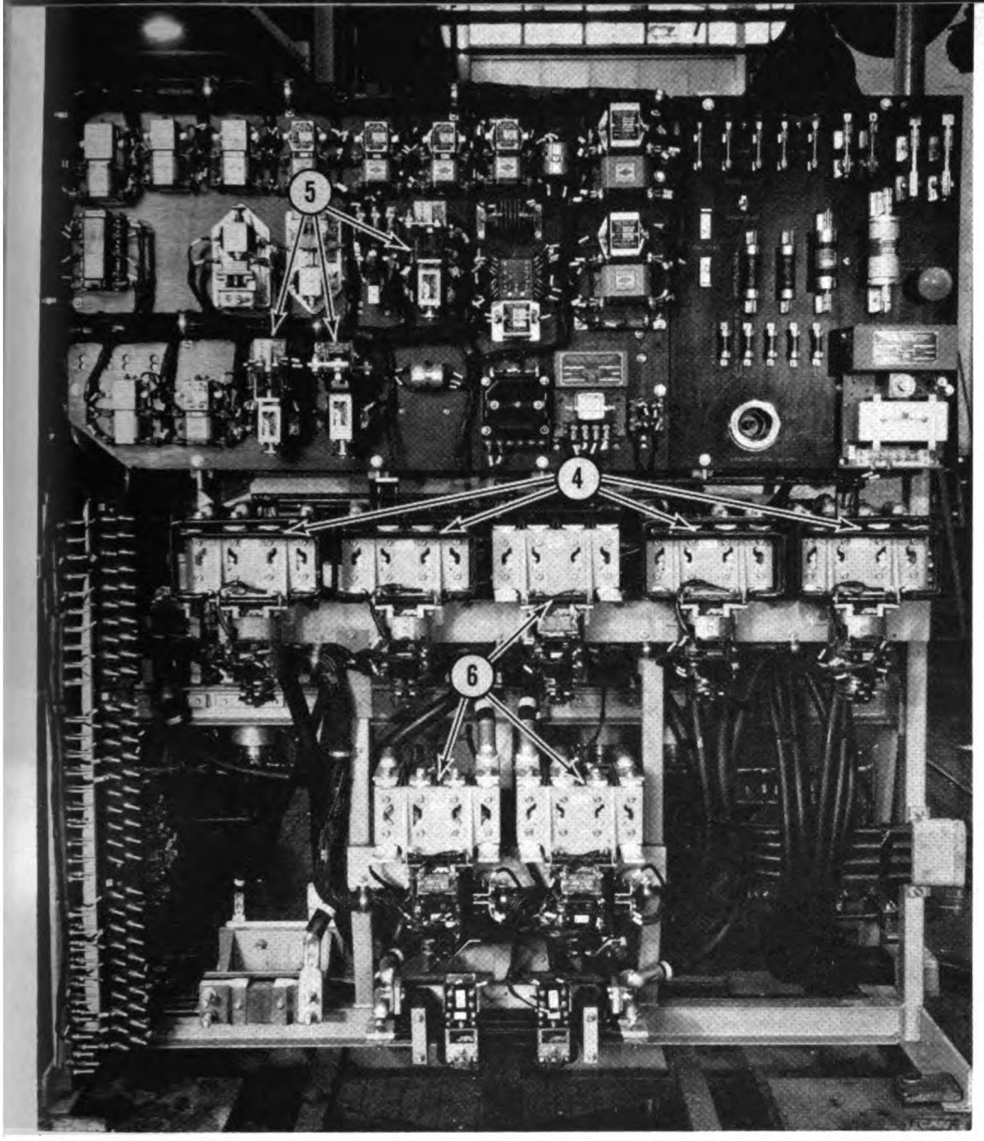




Redesign and simplification resulted in 4-pole motor field shunting contactor (above) which replaces the much larger unit (at left) used when EMD switch gear was air powered.

The redesigned contactor is more compact and the interlocks are enclosed. Bridge type, silver-alloy contacts are provided. The blowout magnets are doughnut-shaped and located under the retaining ring around the stationary contacts. Braided shunts were eliminated. Elimination of the air actuation of this device marked the beginning of a transition leading finally to the 100 per cent electrically controlled locomotive. Pneumatic operation was eliminated from the power contactors; from the eight-pole, double-throw, brake transfer switch; and from the drum reverser. The major troubles experienced with pneumatic equipment have been (1) air leaks requiring constant inspection and replacement of seals, (2) freezing in cold weather particularly on the northern railroads, and (3) sliding contacts on the drum reverser which require frequent lubrication, often after each trip.

Changes made have eliminated all of these troubles and resulted in flexibility of application, ease of replacement and reduction in the space required. The current consumption for the power circuits is the same. Control circuits re-



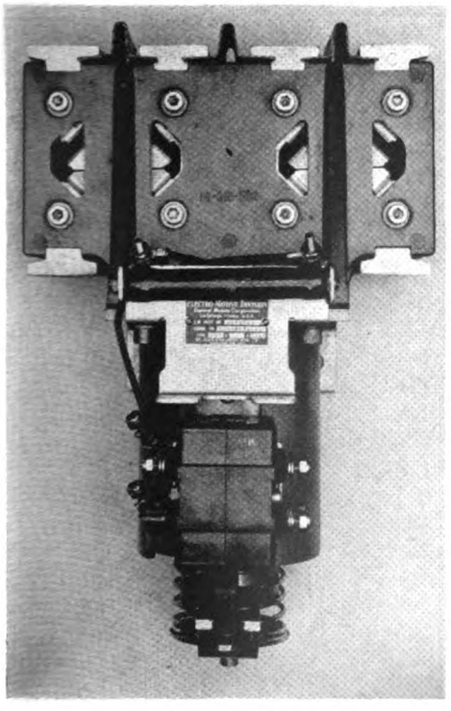
Cab side of new GP-9 all-electric control panel has (4) reverser contactors, (5) shunt-field, battery-field and battery-charging contactors, and (6) camswitch contactors.

quire about ⅓ kw more. In speed of operation, the electric power contactor is no faster on pick up, but much faster—around 0.03 sec—on drop out. The magnet operation makes a cleaner break. The reversing and braking contactors are faster both ways. With all electrical controls, the cabinet can be sealed to keep unauthorized personnel out.

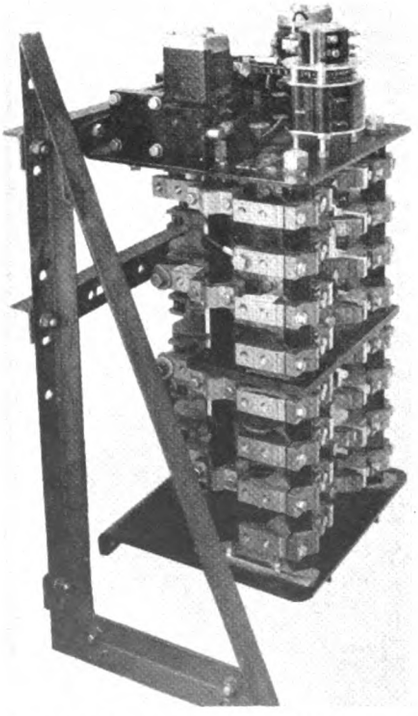
Power Contactors

The power contactor functions to make and break current to the traction motors and to connect them for either series or parallel operation. Prior to July 1957, in addition to the usual air troubles, the pneumatic power contactors were heavy and difficult to apply. Now magnetically operated, these contactors have the basic magnetic frame used on all the new switch gear. The interlocks are enclosed. Alloy contacts are standard and the braided shunts are gone.

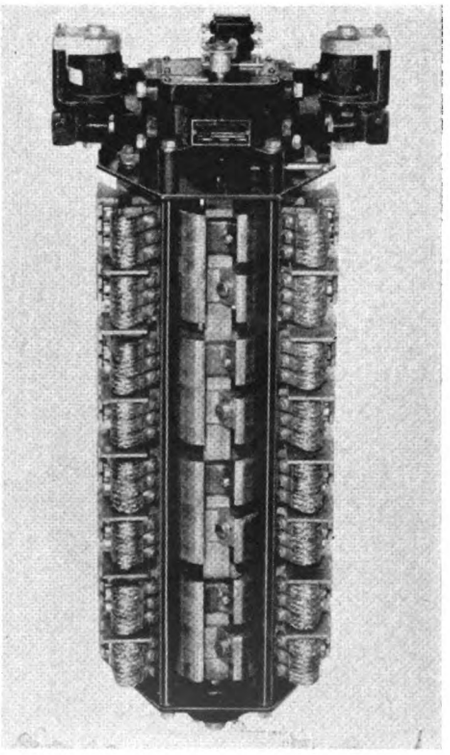
The eight-pole, double-throw, pneumatically operated brake transfer switch had all the shortcomings of any air-operated device. It functions to change the traction motors from motors to generators in dynamic braking. It was cumbersome, and a two-man job to remove or replace. The new unit is a two-pole, double-throw, magnetically operated device with the basic coil and magnet frame assembly. Three of these take the



New style, two-pole, magnetically-operated cam switch replaces both cam switch and reverser with separate, smaller units which are much easier to replace and maintain.



Pneumatically-operated cam switch is 8-pole assembly.



Air-powered reverser is heavy and difficult to handle.

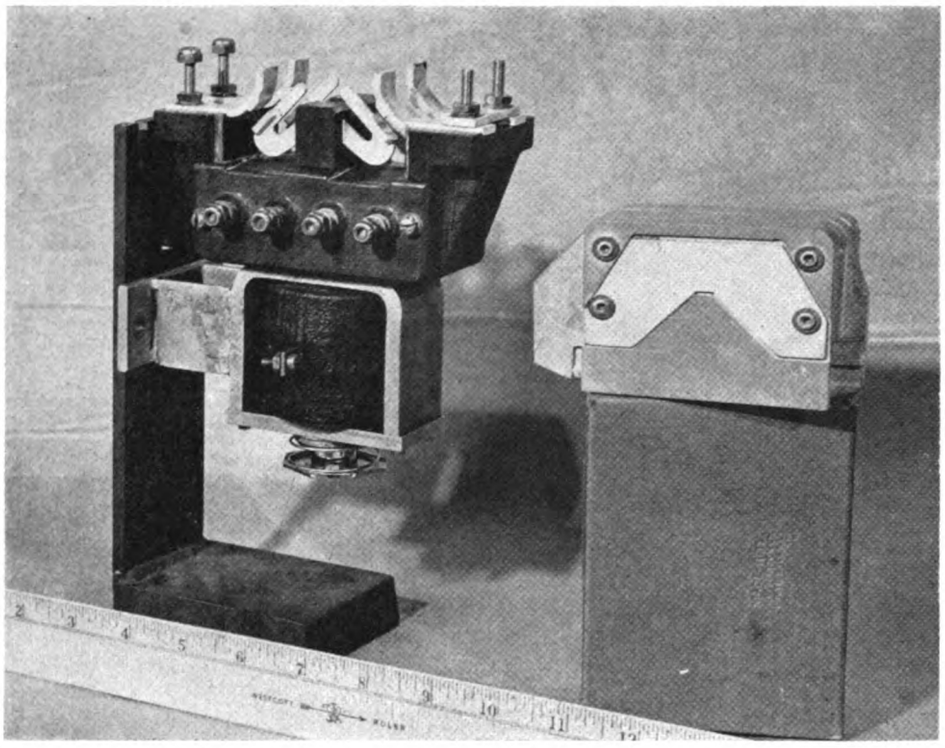
place of the eight-pole device. They are small, compact, and can be replaced as units. The interlocks are enclosed, and braided shunts are eliminated. The alloy bridge contacts are double break, and no lubrication is required.

The pneumatically operated, drum reverser reverses four traction motors at one time by changing the direction of the current flow through their fields. It had magnet valves, a cylinder and piston assembly, and braided shunts. The brass contacts were subject to a high pressure sliding movement which required periodic lubrication depending on the climate and environment. Replacement consists of four, two-pole devices completely eliminating undesirable features.

The first 100 per cent, electrically controlled locomotive was put into service for test purposes on the Great Northern in July 1957. Four more went to work on the Union Pacific in September 1957. In January 1958, these new contactors went into production GP-9 locomotives. The Northern Pacific and Milwaukee received the first such locomotives with this equipment.

The contactors are being made by outside manufacturers, but all of them were designed by Electro-Motive. Air-operated equipment on present diesels can be converted to all-electric control. Generally, a new cabling job is required. One mid-western railroad is having some FT's converted to GP-9M's. On these, control cabinet is replaced as a unit.

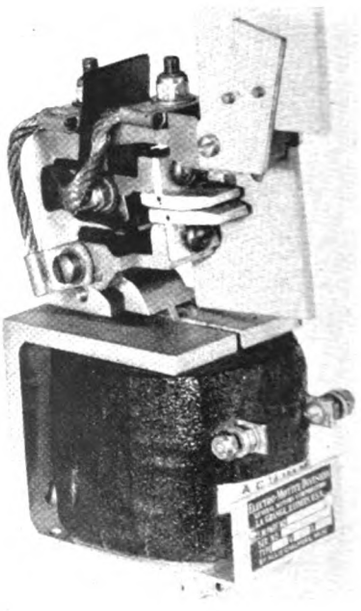
The change from pneumatic control was made possible by dependable interlocking and a very efficient coil and magnet frame assembly. This assembly consists of totally enclosed magnets in a cylindrical iron shell fitted with close-tolerance, fiber-doughnut guides for the actuating plunger. The design minimizes stray flux, and gives a more positive concentration of flux through the air gap. The coil and magnet frame assembly requires little power. This power comes from the diesel unit on which the contactors are installed. An overburden is not placed on the lead unit controller, because when locomotives are used in multiple, this system does not power all contactors from the lead unit. Pilot relays on each unit take a signal from the control train line and contactors are then operated from the batteries or auxiliary generator on that unit.



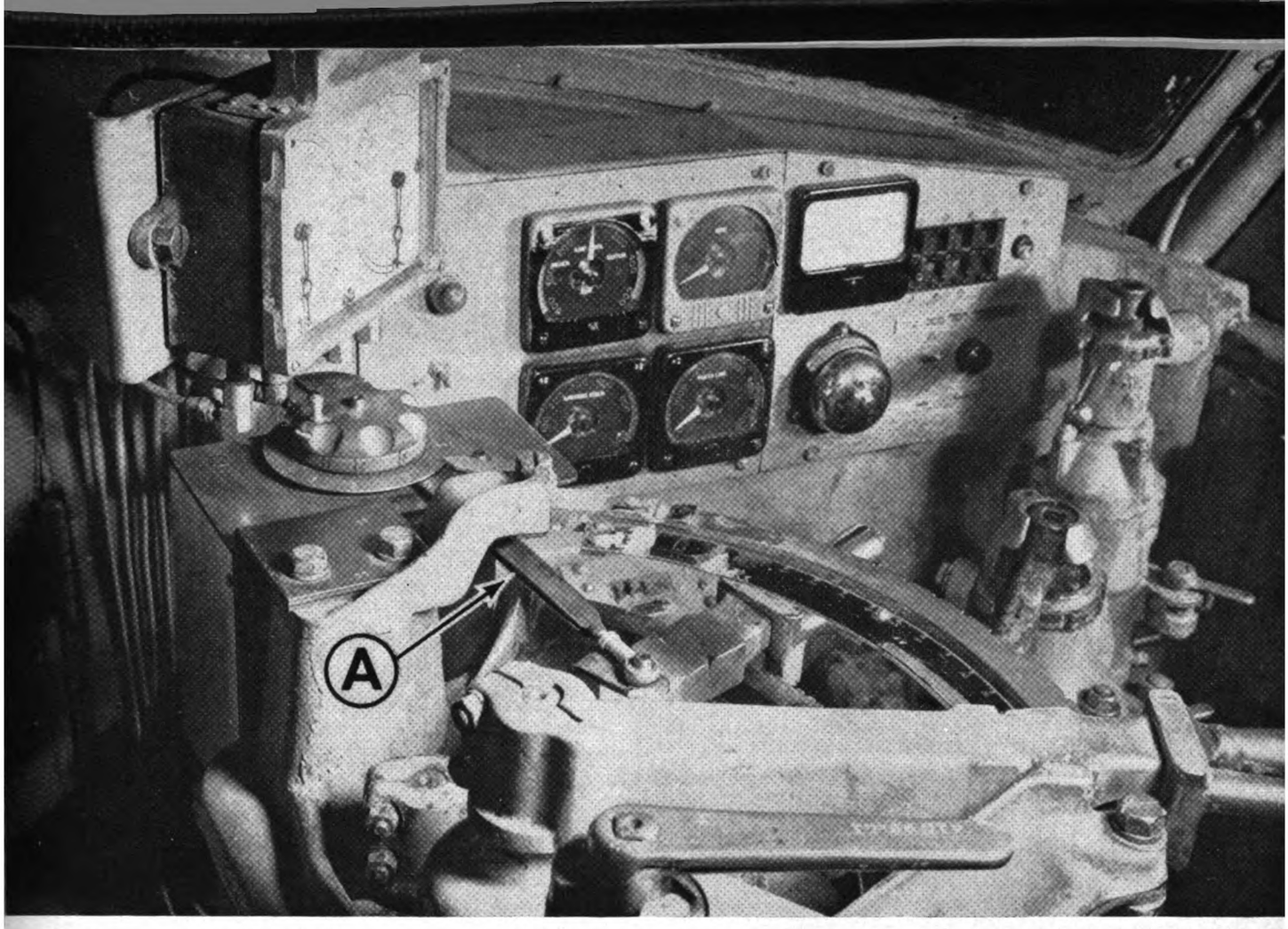
Three contactors of this new magnetically-operated type replace separate models of shunt-field, battery-field and battery-charging contactors used on older EMD units.

Old style shunt-field contactor.

Old style battery-field contactor.



Old Style battery-charging contactor.



The electric locomotive controller is shown in the foreground. The miniature diesel controller shown behind is operated by the rack bar A from the electric controller handle. This bar carries a rack which meshes with a gear on the diesel controller. The meter on the cowl at the right shows diesel traction motor amperes. The four switches at the right of the meter are *control and fuel pump, engine run and controller, generator field* and *headlight*. The button at the far right is *engine stop*. Below is the alarm bell, the sander control and the wheelslip light.

Diesel Boosters for Electric Locomotives

A miniature diesel controller coupled to the main electric controller enables the railroad to use its locomotives to full advantage

AN ARRANGEMENT has been worked out on the Chicago, Milwaukee, St. Paul & Pacific, whereby diesels may be used to supplement the power of electric locomotives. The reason for this development is that, for certain operating conditions, a second electric (which, at times, is not available) would provide more tractive force than is needed, while the smaller diesel is adequate.

Two EF4 electric locomotives can handle 5,800 tons from Avery, Idaho eastbound to Deer Lodge, Mont., (212 miles), but cannot handle such tonnage up the 0.4 per cent grade between Lombard, Mont. and Loweth, Mont., (49 miles). By using the diesel booster, the 5,800-ton train is moved through Deer Lodge, Mont. without switching out a reduction, thereby saving about 1 hr and 30 min. The running time from Deer Lodge, Mont. to Harlowton, Mont. (228 miles) is also decreased by about 30 min. This operation applies only to time freight trains.

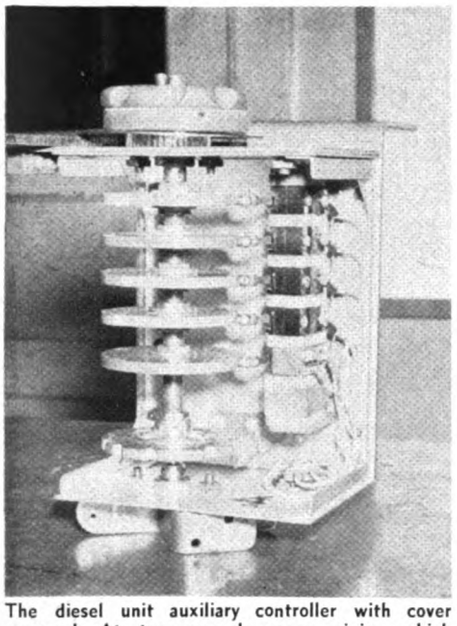
The westward time freight is very fast. With two EF4 electric units and the diesel booster, a 3,600-ton train can be handled over the entire division at passenger train speeds without stopping to cut in a helper. The speed with 5,800 tons on 1.0 per cent grade, or with 3,600 tons on 2.0 per cent grade is 25 mph.

The performance is made possible by a second miniature controller for the diesel which is coupled mechanically to the controller of the electric locomotive. Micro switches located inside the main electric locomotive controller and operated by movement of the electric locomotive reverser control circuit contactors, energize the diesel reverser control circuits, causing the diesel to reverse with the movement of reverser handle on the electric locomotive.

The miniature diesel-electric controller, referred to as the throttle controller, is mounted on the forward side of the main controller in the EF4 electric locomotive and coupled by mechanical means to the main operative lever of the EF4 locomotive controller. The throttle controller is provided with an operating handle and a locking pin by means of which the controller mechanism may be unlocked from the mechanical operating mechanism to permit manual operation of the throttle controller in case of necessity or in emergency.

Switches for controlling forward or reverse movement of the diesel unit are operated by movement of the reverser handle on the EF4 controller. These switches are mounted inside of the main controller case in the EF4 locomotive.

A small diesel unit control panel is mounted on the cowl in front of the engineman in the EF4 locomotive. On this panel are an ammeter showing diesel traction motor amperes, an alarm bell and a wheel slip light. Control



The diesel unit auxiliary controller with cover removed. At top may be seen pinion which meshes with rack bar from the electric controller.

equipment on the panel includes a control and fuel pump switch, engine run and controller switch, generator field switch, headlight switch, sanders and an engine stop button.

Necessary control wires are run through the EF4 units, connecting the diesel control circuits to the throttle controller and panel on the electric locomotive. Control wire connections between the EF4 units, and between the EF4 unit and the diesel unit, are made with standard 27-wire diesel control couplers and sockets.

In operation, the diesel locomotive is coupled to the rear end of the electric locomotive. The brake pipe and signal line hoses are coupled, and hose cocks opened. The equalizing pipe hose on the diesel is coupled to the independent application pipe hose on the electric and hose cocks are opened. The brake equipment on the diesel is conditioned for trailing movement.

Control jumpers are installed between the diesel and electric locomotive, and also between electric locomotives, if two electric locomotives are used. On the diesel control panel, on the cowl in front of the engineman, the fuel-pump and engine-run switches are closed. The locking pin on the miniature controller connection must be down to mechanically connect the two controllers.

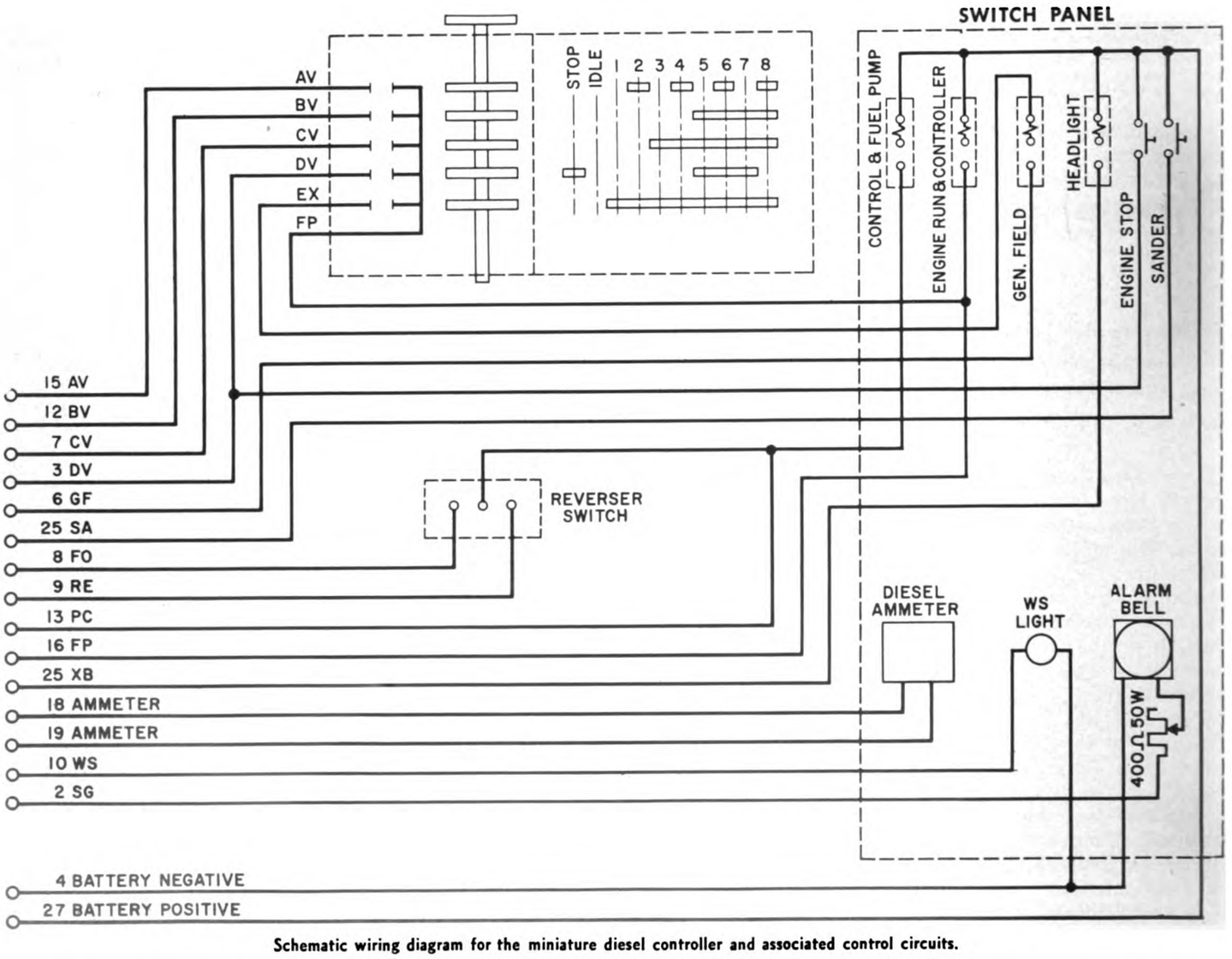
In the diesel locomotive operating cab, on the engineer's panel, all switches are opened with the exception of the automatic sander. In the diesel control cabinet, all switches must be in the *ON* position, and the isolation switch in *RUN*.

The headlight controller switch must be placed in *9 o'clock* position, marked "Controlled from another unit coupled at either end." Control of the diesel locomotive is thus transferred to the operating cab of the electric locomotive.

To cut in the diesel locomotive, the engine run and generator field switches, located on the diesel control panel on the cowl in front of the engineer in the electric locomotive operating cab are closed. The diesel locomotive will then follow the operation of the electric locomotive controller and provide tractive force according to the position of the controller.

To cut out the diesel locomotive, it

(*Continued on page 70*)



Schematic wiring diagram for the miniature diesel controller and associated control circuits.

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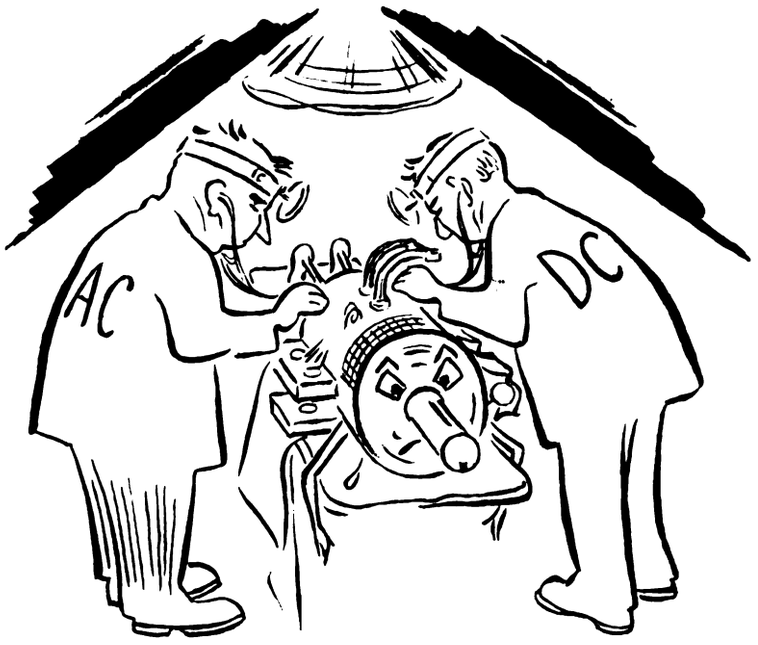
If You Were a Traction Motor . . . Which Would You Prefer?

By Gordon Taylor



THE QUESTION of d-c or a-c hi-potting arose during a discussion among several maintainers. There had been a number of locomotive failures all involving electrical breakdown of traction motors or main generators. It was a matter of much concern to all of them. They decided to ask Doc Watts, the wise old electrical foreman at the system repair shop, to discuss the subject at the next meeting of their local diesel club.

Doc agreed and at the next meeting was on hand. "Most electrical failures," Doc began, "can be prevented by proper tests and maintenance precautions. We would be in a very hopeless business, if everything had to be left to chance. Fortunately, this need not be the case. A good doctor can make tests to determine the condition of his patient and then take corrective measures instead of waiting for a fatality and subsequent post mortem.

"The same opportunity is available for the electrical maintainer to learn if a locomotive is in condition to properly perform its work. These tests need not be made daily. They can be made at regular intervals, if the equipment is maintained in a reasonably clean, dry condition.

"It has been said that 'a man is as old as his arteries and a motor is as old as its insulation'. There is much truth in that statement. No doctor would approve of his patient entering a contest requiring much physical effort, if the patient had a bad heart or very high blood pressure. No careful maintainer should expect a diesel-electric locomotive with weak or defective motor insulation, to continue in heavy train service for long.

"The preservation of high electrical insulation value is one of the most important features of successful diesel-electric locomotive operation. It is so important that the ICC Bureau of Locomotive Inspection requires special insulation dielectric tests at least once a year.

"What is the dielectric value of insulation? Dielectric insulation strength is the quality that allows it to resist passage or leakage of electricity through it. It is vital that proper dielectric strength be maintained at all times. The principal enemies of insulation are dirt, grease and moisture. Because they are all present on locomotives, we must wage a constant battle to keep insulation clean and dry.

"Insulation must be good to meet not only the needs of every day service, but it must be first class to withstand the strain of high-potential dielectric tests. These tests have generally been applied by connecting a high voltage transformer between the circuit to be tested, and ground. The ICC test requires that the test voltage applied to circuits other than motor or generator windings shall be not less than 75 per cent above normal working voltage. The test applied to windings shall not be less than 50 per cent above the normal working voltage. The test is applied for not less than one minute, and shall be applied to all circuits and parts carrying current with potential of more than 150 volts.

"For a power circuit operating normally at 600 volts", Doc explained, "it would be necessary to apply 1,050 volts when making the dielectric test. If the circuit or motor insulation is in a weakened condition, the application of high potential test could be enough to destroy the insulation under test.

"When the ICC first required dielectric tests," he recalled, "our railroad was operating gas-electric cars. When we started making high potential tests, three traction motors were disabled the first week. Those high-voltage tests had completed damaging the insulation to the point where the motors had to be removed for rewinding.

"We figured there must be a better way. No more high-voltage tests were made until the equipment was first checked with a 500-volt direct-current hand-operated Megger-type generator. With this, we could determine the insulation value before applying the high potential test. We quickly found that many motors had weak insulation because of dirt or moisture. They, like a man with high blood pressure, should not be called on to withstand the strain of extra effort. We found that such motors, in many cases, could be cleaned and dried to restore the insulation value so they could successfully withstand the ICC high-voltage test.

"Maintenance would be fairly simple if we had only to worry about the leakage of current through insulation. What makes it tough, is that we must also be concerned about the passage or creepage

(*Continued on page 70*)

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

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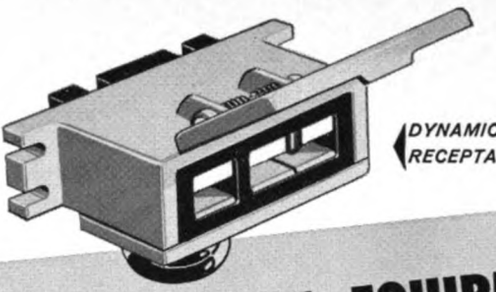

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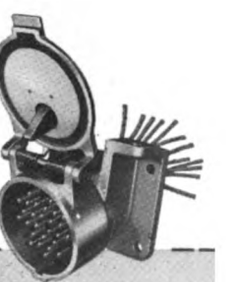

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Which Would You Prefer?

(*Continued from page 68*)

of current across the insulation surface. Such current paths are known as creepage paths, and are caused by the presence of dirt and moisture. Low resistance to current passage along an insulation surface is known as its creepage value.

"A preliminary Megger test, followed by cleaning or drying, and then the a-c high voltage test, constitute the procedure standard on most railroads. However, the men who are always looking for a better way, are considering the use of a direct-current testing procedure. The ICC does not specify that the high-potential test must be made with alternating current. It simply specifies the voltage to be applied. This gives us a choice of alternating or direct current for the high voltage test. We have used a transformer because it is generally more available than a high-voltage direct-current supply.

"Direct-current testing equipment is coming into use on railroads. It has much to recommend it. We have learned that high test voltages can destroy insulation, and that there is no need to apply more voltage than necessary to meet test requirements.

"Now comes the $64 question. Suppose you were going to get a shock from a 110-volt circuit. Would you prefer contact with direct current or with 60-cycle alternating current?"

At this point a young apprentice spoke up. "It seems to me that a volt is a volt wherever you meet. If the voltmeter registered 110 volts in both cases, why wouldn't the effects be the same?"

"Good question," said Doc Watts. "We will clear it up right now. In the case of d-c, the voltmeter registers the maximum voltage. In alternating current, we have a different situation. An alternating current or voltage continually changes in value and direction. The manner of change is represented by a wave form diagram. In an alternating current, the voltage starts at zero, rises to a peak or maximum voltage, drops to zero, then rises to a maximum in the opposite direction, then drops to zero once more to complete one cycle. You can see that twice on each cycle, the voltage reaches a maximum value. But the maximum voltage is not what the a-c voltmeter registers. It registers the effective voltage value, which is 70.7 per cent of the maximum value. Another way to express this idea is to say the maximum effective voltage, reached twice each cycle, is 1.41 times the effective voltage, or 1.41 times the voltage shown by the voltmeter. Thus in 110-volt alternating current, the maximum voltage would be 1.41 times 110 volts or 155 volts. A person getting across a 110-volt a-c circuit, receives 155 volts, 120 times during each second he remains in contact with the circuit.

"You can now understand why the application of alternating voltage to make the high potential test on a motor really applies considerably more voltage than indicated by the voltmeter. Suppose we prepare to apply 1,050 volts from the testing transformer, to a diesel power circuit or generator. The maximum voltage across the test circuit is really 1.41 times the voltage shown by the voltmeter, or 1.41 times 1,050 volts which is a total of 1,480 volts. This means we applied 430 volts more than was needed to satisfy the I.C.C. test requirement.

"There is much more to be said in favor of d-c testing, than the prevention of excessive voltage strain on the insulation of the locomotive.

"The principal advantage of the new direct-current test sets is that they able the maintainers to more exactly termine the condition of the insula of the locomotive under test. It has found that when the d-c test voltag increased in steps, that ionization oc at a voltage below that which m cause breakdown of insulation. condition of ionization can be dete as a visible oscillation on the oscillos which is part of the d-c tester. pattern of oscillations indicate the c acter of insulation conditions, such "dry and clean", "dry and bad", "w or "very wet insulation. When the tests more exactly pinpoint the co tion of insulation, the maintena force can more intelligently prepare equipment for final high potential test

"The d-c high potential tests are n destructive if they are stopped when appreciable amount of ionization is served. This is because breakdown always preceded by ionization charges in the insulation system.

"The a-c high potential test equ ment in common use does not give wa ing that a further increase in test volt will bring destruction of insulation. cause it cannot so definitely indicate condition of insulation, the a-c meth permits you to blunder into a test t may destroy the insulation, and ca the need of rewinding a motor or g erator.

"There are two things to be learn from this discussion—First—The method of testing and applying the h potential test, or "hi-potting", offers definite improvement over the method. Second—Dirt in its vario forms is Diesel Enemy Number O As with other public enemies, there reward for its capture or banishme Banish dirt from the diesel, and yo reward will be better diesel perfor ance, and reduced repair cost."

Diesel Boosters . . .

(*Continued from page 66*)

is necessary to open the engine run and generator field switches, located in the diesel control panel in the cowl in front of the engineman in the electric locomotive operating cab.

For normal motoring operation, it is necessary to throw the reverser on the EF4 controller for the desired direction of movement and then advance the controller handle in the usual manner, allowing sufficient time for slack action in the train and for throttle governor control in the diesel unit. The diesel throttle controller will follow the movement of the EF4 controller, so that the diesel locomotive will be in No. 8 throttle, or full run position, when the EF4 controller is partially out. During further advance of the EF4 controller, the diesel locomotive continues in No. 8 throttle position. Any running position on the EF4 controller is a running position on the diesel locomotive.

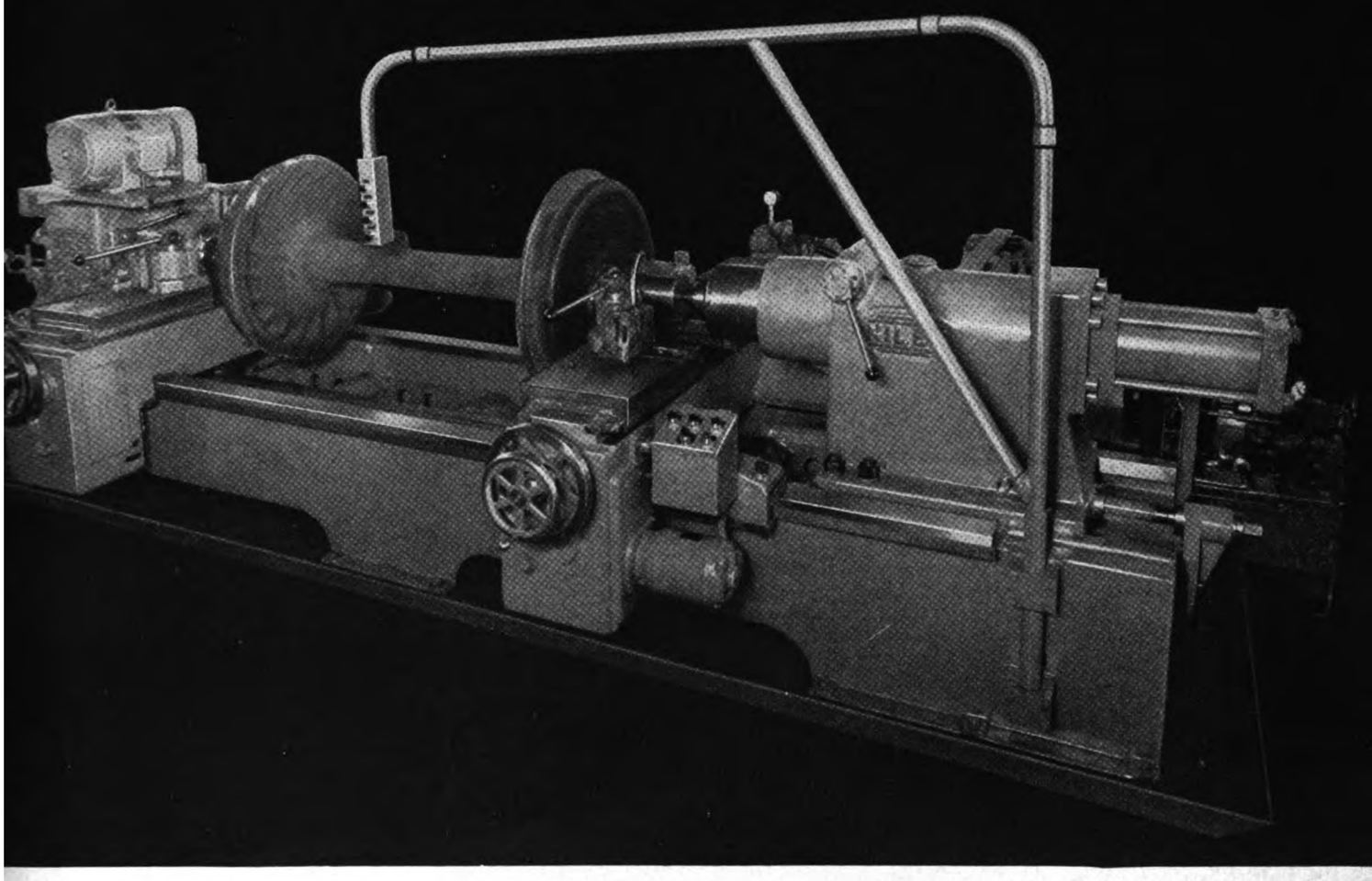
If the diesel locomotive begins slipping for any reason, it will automatically sand and ultimately unload itself. Before this condition develops, action should be taken to correct it by partially unloading the diesel locomotive.

Before commencing regeneration, the EF4 controller handle must be moved to the *OFF* position and engine run generator field switches on the die panel in the EF4 cab must be thrown the *OFF* position and left in that po tion until regeneration is discontinue

The diesel booster should only be in when there is actual need for ad tional tractive force to handle a train an ascending grade. When the elec locomotive is used without the die booster, the locking pin in the top the diesel throttle controller must raised.

This scheme of operation and equipment for making it possible wa devised by Laurence Wylie, consult electrical engineer.

NEW FROM NILES



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One of its many new features is the hydraulic power activated burnishing rolls on which pressure is automatically equalized. It is possible to turn or burnish inner bearings up to a maximum axle length of 13'-½" long without reversing the wheel set. For the maximum in railroad shop efficiency, write Dept. 9J for details and descriptive technical data on this new railroad tool.

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With ICC Wheel-Welding Ban . . .

P&WV Tests Cobra Shoes in Road Service

A NUMBER of the requirements of the ICC's recently issued Ex Parte 174, present problems to the hilly 132-mile Pittsburgh & West Virginia. Of greatest concern in these new Other-than-Steam Inspection Rules probably are the provisions of Rule 227 (o). The new rule reads: "Fusion welding shall not be used on tires or rolled steel wheels including building up of worn flanges, flat spots, shelled-out spots or for repair of cracks, except on locomotives used exclusively in switching and transfer service, and then only for repair of flat spots and worn flanges."

The P&WV's motive power roster includes 26 Fairbanks-Morse 1,600- and 2,000-hp road switchers. All of these units are used in both road and yard service. None of them have dynamic braking.

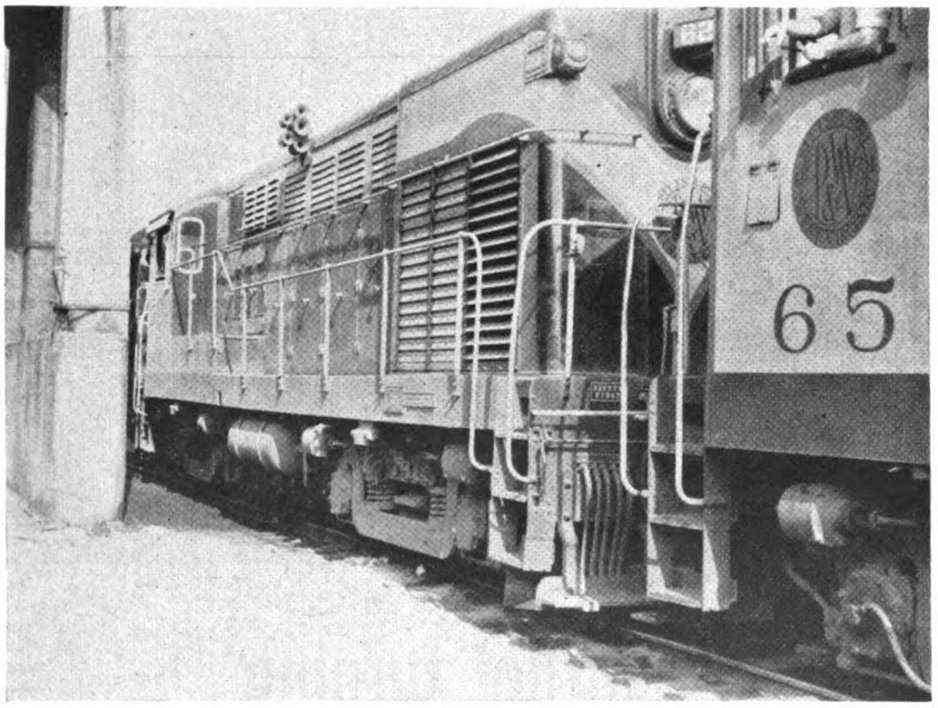
The P&WV has no machines for turning wheels in place under these locomotives. It is necessary to use a drop pit and then transfer the wheel set to a lathe in the locomotive shop. In the past, it has been the practice to weld flat spots on the drivers of these road switchers and no difficulty has ever been encountered. Because it has, so far, been impossible for the P&WV to justify a wheel truing machine, and because the ban on wheel welding is effective January 1, 1959, it was necessary to seek some other answer.

Recently the P&WV has completed its second installation of composition Cobra brake shoes, made by the Railroad Friction Products Co. As yet, the two units have not operated long enough to tell exactly what these shoes can do. A number of railroads already have switching locomotives equipped with them, and report that these shoes last several times as long as those formerly standard. The railroad operated by the Erie Mining Company in Minnesota, (RL&C, August 1957, p. 52), has all of its road units fitted with Cobra shoes.

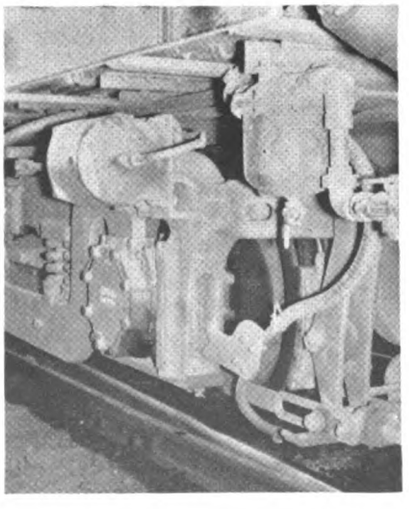
The P&WV has been one of the first railroads to convert existing road-service locomotives. The mechanical department found it was an extremely easy job. A conversion kit from Westinghouse Air Brake includes bushings for each of the eight brake cylinders, grommets for sealing these bushings against the brake cylinder heads, new smaller pistons, the 16 composition shoes, and a pressure spring for the locomotive's independent brake valve. The change was made in approximately four hours.

Braking forces must be reduced with these shoes because of their higher coefficient of friction. Some roads, in equipping switchers, have attempted to cut the brake cylinder pressure and use the original cylinders without bushings. The manufacturer recommends that the cylinder pressure actually be increased while the piston area is cut to insure that brakes will release because a substantial pressure differential exists between the applied and the released positions. Cobra shoes used on P&WV locomotives are of the type which brake on the flange surfaces as well as the tread.

The constant frictional characteristic of the composition shoe is what the Pittsburgh & West Virginia expects to prevent wheel sliding. Tests run on the converted locomotives showed that it was virtually impossible to slide the wheels even with a full application of the independent brake. Several weeks of operation on the road have shown that the wheels are not developing their usual quota of flat spots. At the same time, they are not requiring the frequent shoe changes which were formerly necessary.



Locomotive 62, first P&WV unit to get composition shoes, was operated as a center unit of a three-unit locomotive initially. When controlled from units with standard independent brake pressure settings, the higher brake cylinder pressure could not be applied. Had Locomotive 62 been used as the lead unit, its 56 psi independent brake setting would have slid wheels on units with metal shoes.



Conversion involves changing the brake shoe and applying new piston after bushing the cylinder. Flange-type shoes are used on the P&WV locomotives.

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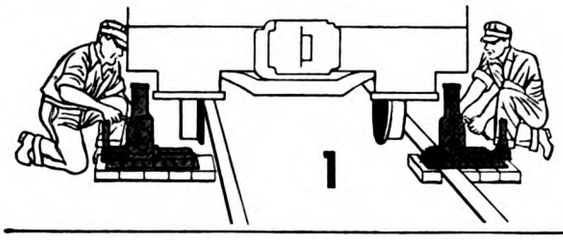
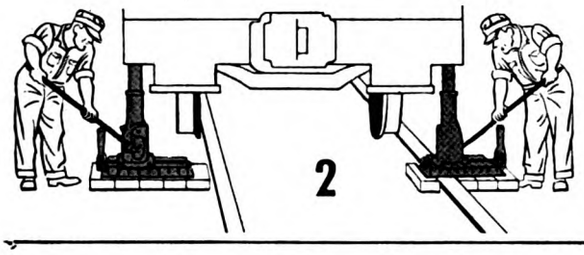
How to get back on the track quickly

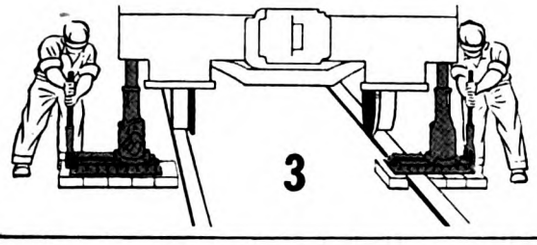
Without A Crane!



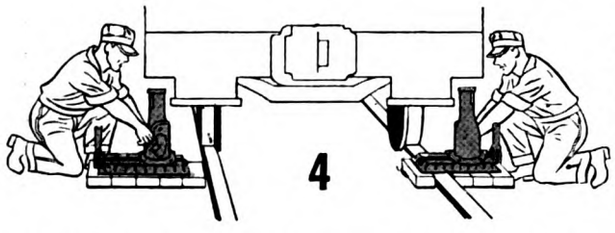
Place a *Duff-Norton traversing base* and *jack* beside each derailed truck.



Jack up the car or locomotive until wheels clear top of rails.

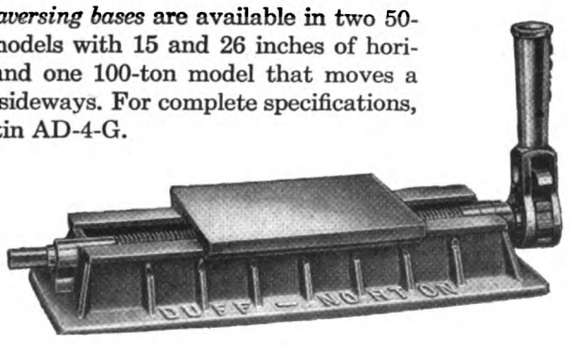


Move jacks horizontally simultaneously on traversing bases until wheels are in alignment with rails.



Lower wheels; you are back on the track, quickly, inexpensively and without danger of distorting car or locomotive frame.

Duff-Norton traversing bases are available in two 50-ton capacity models with 15 and 26 inches of horizontal travel and one 100-ton model that moves a load 20 inches sideways. For complete specifications, write for bulletin AD-4-G.



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Ratchet, Screw,
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DUFF-NORTON

COFFING HOISTS
Ratchet Lever
Chain, Electric

What's New

(*Continued from page 24*)

is simple, no basic alternations either to the motor or tool being involved. *Buckeye Tools Corporation, Dept. RLC, 5053 Springboro Pike, Dayton, Ohio.*

Strip Coat for Paint Booth Walls

Magnus Strip Coat SC100 forms a white opaque film which can later be peeled easily from the surface. It is used in paint spray booths for improving illumination and for removing overspray which accumulates on walls. Strip Coat is non-toxic. It contains no chlorinated solvents; has a solid content of 30 per cent, and can be applied by spray or brush. It colors 200-300 sq ft per gal and dries in 10 min. No thinner is needed when applied by pressure spraying equipment. *Magnus Chemical Company, Dept. RLC, South ave., Garwood, N.J.*

Tong Test Ammeters

An improved Tong Test ammeter has a larger damping chamber for each scale range ... makes readings easier by providing improved damping characteristics. It has a heavier and

(*Continued on page 76*)

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Here's why the ROCK ISLAND adopts Plastinail* as a means for restoring B and C FLOORS

"A velvet-smooth floor"

"Damage Claims Reduced"

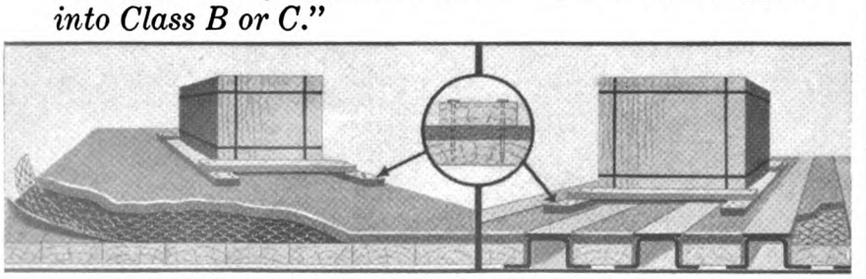
"Plastinail costs less to install than a new wood floor"

Reports the Rock Island Railroad: *"We installed our first Plastinail test floors back in 1947. In 1949, and again in 1953, additional Rock Island cars were Plastinailed. Careful records have been kept on costs and performance.*

"Based on these tests we have begun, in our El Reno, Oklahoma shop, a schedule of reconditioning floors with Plastinail as soon as they drop into B or C service.

"We have found that when a sound B or C floor is Plastinailed it will provide seven or eight years or more of Class A service. And a Plastinail floor is better — smooth, inorganic, non-absorptive, nailable, easily prepared. Shippers like it. Our damage claims are less.

"And here's the vital point: Plastinail costs less to install than a new wood floor. The first cost is less, and the service is supreme. A Plastinail floor stays in Class A long after a new wood floor has dropped into Class B or C."



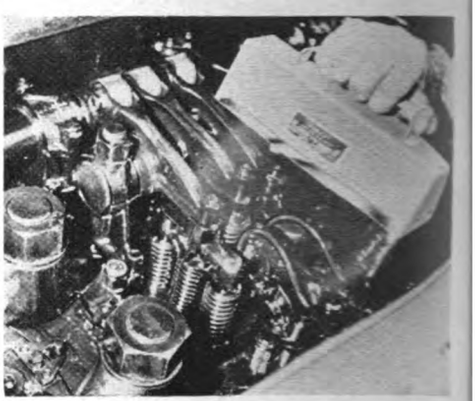
Plastinail Nailable Cement Floor in standard box car

Plastinail Nailable Cement in conjunction with steel as an original floor

F. E. SCHUNDLER & COMPANY, INC.
504 Railroad St. Joliet, Illinois

stronger scale range construction, insulated operating trigger, and plastic handle. Pressing the trigger snaps the tongs around an electrical conductor without breaking circuit or insulation. Readings are instantly obtained. There are no coils or windings, eliminating danger of burnouts.

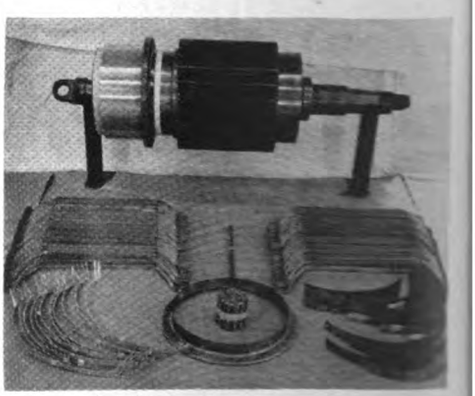
The Tong Test is available in eight different types and measures up to 1,000 amp. It is equipped with larger interchangeable ranges, making it impossible to read the wrong scale. *Columbia Electric Manufacturing Company, Dept. RLC, 4519 Hamilton ave., Cleveland 14.*



Leak Detector

Tracing fuel line and injector leaks with the Blak-Ray lamp, which causes oil to fluoresce, makes it possible for a leak to be traced directly to its source. Diesel fuel oil glows deep blue, and lubricating oil glows a bright blue-white.

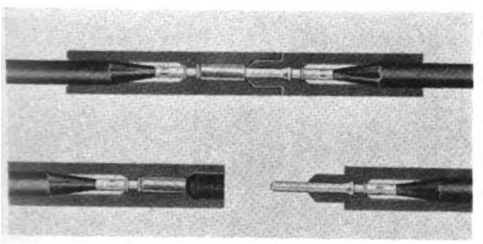
The Blak-Ray is harmless to eyes and skin and is available for 110-volt a-c and portable battery operation. *Black Light Eastern Corp., Dept. RLC, 201-04 Northern Blvd., Bayside 61, N. Y.*



Traction Armature Rewind Kit

The kit contains molded-form coils based on a special 100 per cent solids epoxy-resin insulation. Each coil is molded to the exact dimensions of the armature slots—eliminating voids, air pockets and solvent passageways. The construction is claimed to provide positive space factor and extreme winding ease.

According to the manufacturer, breakdown readings exceeding 10 kv have been obtained at room temperature, with the dielectric strength retained substantially unchanged to 500 deg F. Readings are not changed after 24-hr total immersion in water. The coil is not affected by solvents, oils or other contaminants. *Epoxy Coil Corporation, Dept. RLC, 11510 S. Alameda st., Los Angeles 59.*



Underground Cable Connectors

This waterproof underground cable connector is packaged as a four-part kit for easy field installation. Once assembled, the field-installed connector may be separated for testing or servicing the line and the circuit re-established with the easy plug-in assembly.

The kit is composed of a molded rubber receptacle housing with a disposable assembly sleeves, a metal receptacle fitting with a disposable assembly pin, a molded rubber housing for the plug, and a metal plug fitting. Insulating jelly is inserted into each housing at the factory to fill all voids. This prevents the formation of corona, excludes moisture, and eases the attaching to the cable.

To assemble the connector, the metal plug and receptacle fittings are crimped onto the conductors. The fittings and cable are inserted into the housings. When in place the disposable pin and sleeve are removed, and the connections plugged together. *A'G'A Div., Elastic Stop Nut Corporation of American, Dept. RLC, Elizabeth, N. J.*

Liquid Compound for Steam Cleaning

Magnus 215-D, a liquid compound for use in steam cleaning machines, has been formulated for the heavy duty requirements of cleaning railroad equipment and machinery. Its detergency and wetting action are said to give rapid penetration, emulsification and dispersion of thick, dirty, greasy deposits from metal surfaces. It eliminates the possibility of undissolved material clogging lines and nozzles of cleaning machines, and does not have to be premixed. Water conditioning agents in 215-D prevent build-up of scale on the coils of the machine.

It rinses fast and thoroughly. When rinsed correctly, no white film of unrinsed residue is left. It is non-toxic and contains no cresylic acid, chromates or phenol. *Magnus Chemical Company, Dept. RLC, South ave. Garwood, N. J.*

Electric Impact Wrench
UL and CSA approved

TWO NEW KITS
Air-powered
Model MM-43
illustrated at right

Electric-powered
Model MM-40
not illustrated

Save on locomotive maintenance with new Remington Impact Wrench Kit

OTHER DEPENDABLE REMINGTON POWER TOOLS

Air Small-Wheel Grinder, Model PG-2022L—Wheel diameter: 1" vitrified, 1½" organic; speed: 22,000 rpm at 90 psi.; equipped with regulator; length 10⅛"; wt.: 1¼ lbs.

Air Drill, Model PD-328P—½" capacity; air-powered; speed: 575 rpm at 90 psi.; built-in oiler and speed regulator, ball bearings throughout; with geared chuck and key.

Electric Flexible Shaft Machine, Model 8FGP—3-hp induction motor, totally enclosed, dustproof: geared drive delivers 4,500 rpm for grinding, sanding, wire brushing.

Air Circular Saw, Model P128—12" blade cuts full 4⅜"; cuts 3⅝" at 45°; blade guard; safety trigger switch. Complete with blade, case and hose.

Here's a new concept for improved worker efficiency—a multi-purpose power tool that can save costly man-hours in maintenance. The new Remington Mechanics Maintenance Kit features a reversible impact wrench—air or electric models available—plus special accessories that handle drilling, screwdriving and wire brushing as well as bolting. Each kit is portable and *complete*—air kit includes filter-lubricator and 15-ft. hose. On-the-job tests prove kits do maintenance work significantly faster.

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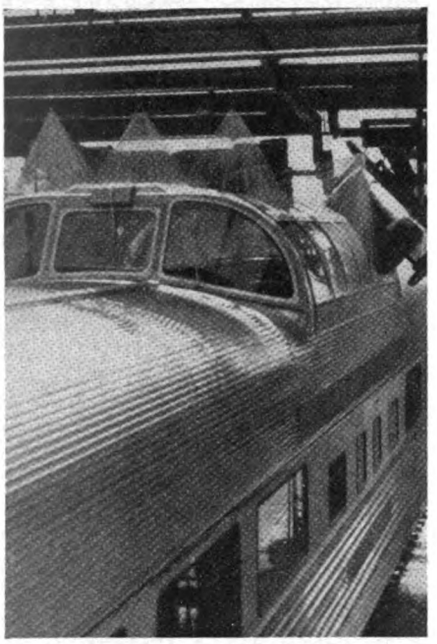

$2600 saved monthly on car washing

Switching over from a so-called "economy" cleaner to Oakite Compound No. 88 saved a Class 1 road more than $2600 a month. Why? The Oakite material proved more efficient. It not only cleaned car exteriors thoroughly, and left windows streak-free and sparkling – but did it with more *dilute*, more *economical* solutions.

While *original* cost-per-pound was slightly higher for Oakite Compound No. 88, the end results showed a real saving. Ask your local Oakite man to tell you more. Or, write Oakite Products, Inc., 46 Rector St., New York 6, N.Y.

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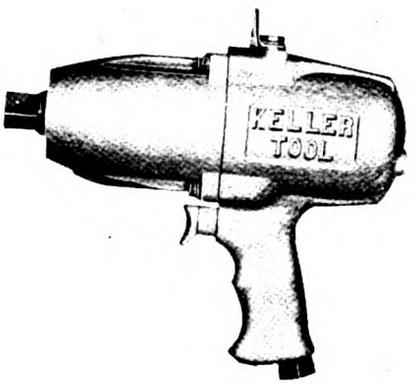


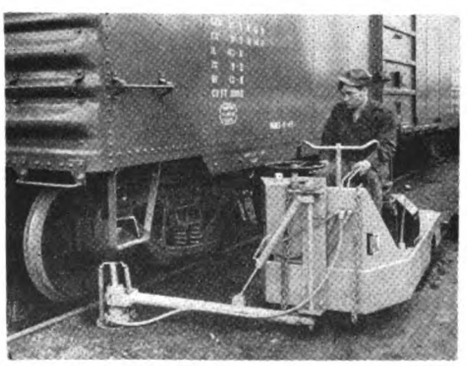
Impact Wrench

This new wrench is available in two models, each rated at ¾-in. nut-setting capacity. Both feature light weight and small dimensions. Model 18B-7 is equipped with a ¾-in. square drive and Model 18B-7S has a ⅝-in. built-in hexagon slip chuck. Accessories include stud drivers, socket adapters, hexagon shank socket holders and universal joint socket adapters. *Gardner-Denver Company, Dept. RLC, Quincy, Ill.*

Locomotive Wiring Cable

Cable SI-58215 meets AAR Specification 581.1. It is available in sizes from No. 16 AWG up to 1,000 MCM. The small overall diameter is designed for installation in the limited space available on locomotives and cars. The conductor is coated copper, extra flexible and rope stranded. Sizes larger than No. 6 AWG have a separator between the conductors and insulation. The rubber insulation is said to be moisture- and heat-resistant. The neoprene jacket is resistant to oil, alkalis, acids and sunlight.

The cable is easy to handle and pull through conduit. Its long life is said to cut maintenance time and replacement expense. *Wire and Cable Dept., General Electric Company, Dept RLC, Bridgeport, Conn.*



Hydraulic Journal Jack

A 20-ton capacity hydraulic journal jack, available as an attachment on the Kalamazoo Model 2500 Speed Truck, simplifies and mechanizes the removal and replacement of freight-car journal brass. The attachment includes a power take-off unit for the Wisconsin engine driving a 6-piston, 6,000-psi,

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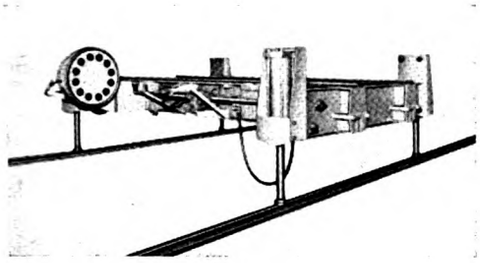
wobble-plate type Blackhawk hydraulic pump. The control valve is a two-spool, open-center, three-position bank style, with one lever for raising and lowering the boom and one for raising and lowering the jack. The ram plunger has 6-in. travel and the effective ram area of the jack gives a lifting force of 40,000 lb. The boom can be swung 180 deg by manual rotation of the control wheel and will hydraulically raise or lower the base of the jack 26 in. above or 26 in. below the roadway level.

The truck is equipped with a 2-cylinder, 16.4-hp, air-cooled engine with automotive gear transmission, three speeds forward and one reverse. Space is available to carry replacement brasses, tools and other equipment. The weight of the truck with jack is 1,700 lb. Overall length is 155 in., width 42 in., and height 48½ in. *Kalamazoo Manufacturing Company, Dept. RLC, 1827 Reed st., Kalamazoo, Mich.*



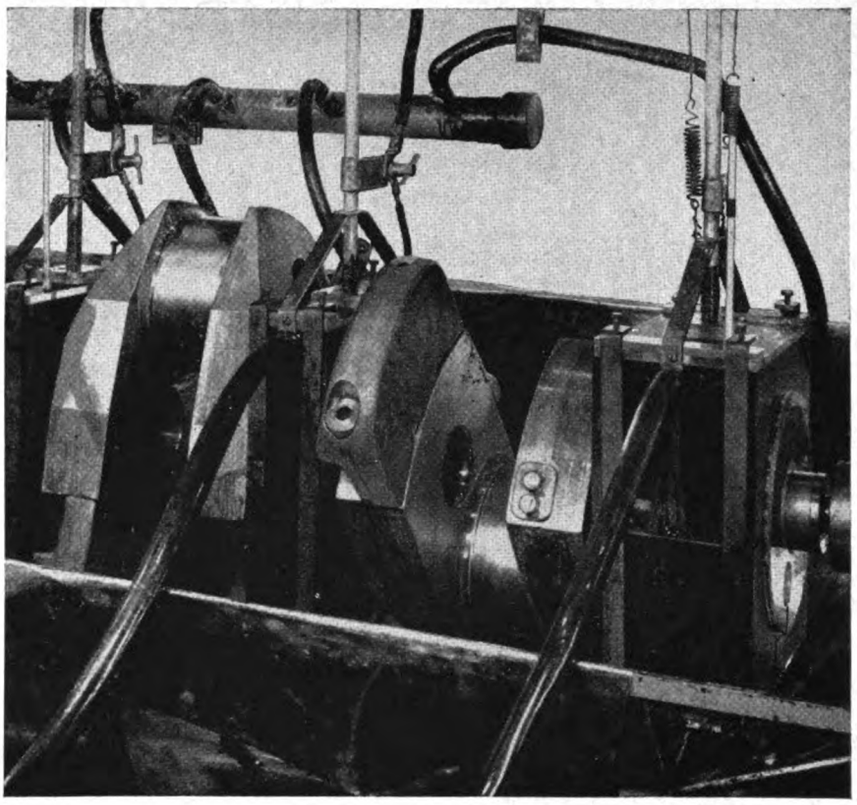
Drop Tables

These hydraulic drop tables are designed for servicing four- and six-wheel diesel locomotive trucks. Only three feet of space is required between the drop table base and the shop track. This low clearance permits the use of elevated service tracks, eliminating expensive pit construction.

One electric motor drives the hydraulic pump which provides power for all lifting, lowering and traversing operations. Geared type flow dividers meter equal quantities of fluid to and from the four hydraulic cylinders. This insures even, level raising and lowering of the table. Check valves for each cylinder act as supporting brakes should pressure to the cylinders be interrupted for any reason. Controls are interlocked so only one motion can occur at any one time.

Four hydraulically operated latch bars support the drop table and locomotive at track level. They remain extended as safety stops while the locomotive is raised to car body supports. Vertical guides insure alignment of table top rails and service track. Two rack- and pinion-driven car body support pins securely hold the locomotive in raised position so the trucks may be removed.

The drop table is traversed by a hydraulic motor which takes its power from the electrically-driven pump. A table-mounted, spring-loaded, electric cable reel automatically lays down or retrieves cable as table is traversed. Electric motor, hydraulic pump, reservoir and solenoid valves are enclosed in a compartment to prevent entrance of dirt and moisture. Hinged cover opens for convenient access to working parts. *Shaw-box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Dept. RLC, Muskegon, Mich.*



THIS REBUILT CRANKSHAFT IS CHROMIUM PLATED BY A SPECIAL NATIONAL FORGE PROCESS

When your crankshaft is reconditioned at National Forge, here's how it is chrome plated. Each bearing surface is individually boxed and plate thickness is built up only as required. Different thicknesses—over ⅛" if needed—can be added to different surfaces of the same crank. Because only the boxed surfaces are exposed to plating action the fillet areas retain their original strength.

When applied by National Forge specialists, chrome plating is uniform and smooth. Regrinding is kept to a minimum and your reconditioned crankshafts are returned to you meeting the original shaft's specifications.

No other plating company has National Forge's experience in handling both new and rebuilt crankshafts. So why not try National Forge specialists on your crankshaft rebuilding jobs?

This is a finished, repaired crankshaft after processing by National Forge.

For more details on crankshaft repair, write for Bulletin RC-1.

NATIONAL FORGE
AND ORDNANCE COMPANY
IRVINE, WARREN COUNTY, PA.

COST-SAVING SUGGESTION ON DIESEL BRUSHES

Unless commutator maintenance is figured as an integral part of diesel-electric brush costs, the result may be an entirely inaccurate slant on the relative efficiency of various brush grades.

Obviously, commutators that have been bar-burned by improper brushes cost more to recondition (and may even have to be reconditioned oftener) than those requiring only normal periodic maintenance.

Our suggestion, then, is this: *Over a span of, say, 600,000 miles, test Stackpole Brushes against any grades you may now be using.* Add costs for as many brush sets as may be needed to *overhaul costs on the commutators involved . . . and compare the results.*

Then you'll have convincing proof of what we mean when we say: "Stackpole Brushes help keep diesel-electrics rolling . . . p-r-o-f-i-t-a-b-l-y!"

Your nearest Stackpole field engineer will gladly help you in arranging such a test.

STACKPOLE
diesel-electric
BRUSHES

FOR MAXIMUM MILEAGE CONSISTENT WITH SMOOTH, BURN-FREE COMMUTATION

STACKPOLE CARBON COMPANY, ST. MARYS, PA.

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

STATIONARY BATTERIES. 12-page Bulletin GB 1848 carries complete specifications and installation data for the new lightweight Calcium batteries from 50 amp hr to the large 1140 amp capacity cell. (Write: *Gould-National Batteries, Inc.*, Dept. RLC, Trenton 7, N. J.)

COIL SPRINGS. 48-page Heavy Duty Coil Springs Handbook includes mathematical data and charts to help buyers and users develop springs to meet exact specifications. Contains a section entitled "Fatigue Resistant" Single Heat Treated, Shot Peened Helical Springs. (Write: *Crucible Steel Company of America*, Spring Division, Dept. RLC, Box 2518, Pittsburgh 30.)

FLAME CUTTING MACHINE. 8-page booklet, form ADC 673, details features of Airco No. 20 Radiagraph flame-cutting machine. (Write: *Air Reduction Sales Company, a division of Air Reduction Company*, Dept. RLC, 150 East 42nd st., New York 17.)

LOCOMOTIVE CABLES. 4-page folder, Pub. 19-278, describes GE line of cables for power, control, and other essential circuits in new or maintenance wiring of many types of locomotives. (Write: *General Electric Company*, Dept. RLC, Bridgeport, Conn.)

WRENCHES AND HAND TOOLS. 156-page industrial tool catalog for users of power-driven nut runners and impact wrenches. Dimensions and specifications listed, also automotive tools and shop equipment for car and truck fleets. (Write: *Snap-On Tools Coporation*, Dept. RLC, 8028 28th ave., Kenosha, Wis.)

MATERIALS HANDLING EQUIPMENT. 8-page Catalog No. 58 covers safety hoist hooks, insulated safety links, safety hooks for utilities, truck step, and back-up alarm. (Write: *E. D. Bullard Company*, Dept. RLC, Sausalito, Cal.)

CENTERS AND GRINDER DOGS. 20-page catalog describes full line of Red-E centers and grinder dogs, including railroad axle and wheel-turning machine centers. (Write: *Ready Tool Company*, Dept. RLC, 150 Garfield ave., Stratford, Conn.)

SPEED MEASURING INSTRUMENTS. 20-page Bulletin 35 covers a wide selection of ranges and types of speed measuring instruments for applications in all industries. (Write: *James G. Biddle Company*, Dept. RLC, 1316 Arch st., Philadelphia 7.)

CUTTING TORCHES. 6-page folder (Form 1174) describes complete line of Oxweld flame-cutting apparatus for every flame-cutting job and for every fuel gas combination. (Write: *Linde Company, Division of Union Carbide Corporation*, Dept. RLC, 30 East 42nd st., New York 17.)

Yellow Strand Braided Safety Slings

You're sure with Yellow Strand Braided Safety Slings on your equipment. These slings combine strength and flexibility to provide safety and ease of handling.

There's a Yellow Strand Sling designed to handle any load on your railroad from a highly polished crankshaft to a Diesel locomotive. Write us today and tell us the size, weight and nature of your problem lift. Our engineers will design a sling to exactly meet your needs! Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.

Yellow Strand® WIRE ROPE

Monon Railroad Speeds Car Repair with Arcair

Use of the Arcair Torch at the Monon Railroad Car Shops, Lafayette, Ind., is standard procedure on all types of cutting and gouging applications.

Here's why . . . Arcair has cut metal removal time on all jobs encountered. On car repair, for example, it formerly took 6 hours to vee out a center plate cracked stem to stern. Now, Arcair gouging *plus* re-weld takes a total of only 2 hours, just ⅓ the time. And three Arcair Model H-3 torches are used "just about every place"—removing truck pedestal liner welds, welded patches, etc.

Arcair can help you too! Basic simplicity — electric arc plus ordinary compressed air — makes Arcair the new, efficient, cost-cutting answer to your metal removing problems.

Get more information from Arcair today!

Arcair® Metal Removal Torches

474 S. Mt. Pleasant St., Lancaster, Ohio

MECROME LINER POROSITY

as uniform as the rifling of bullets from the same gun!

The distribution of pockets that retain the lubricating oil on the bearing surfaces of Mecrome liners is as uniform as the rifling of bullets fired from the same gun! This means "break in" periods are rapid. The bearing surface has no large solid unetched areas that cause friction where the liners contact the rings. This even distribution of pockets also results in long liner life as there are no large soft spots that wear out prematurely. Keep diesels in service longer. Send us a trial order today.

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Personal Mention

(*Continued from page 18*)

H. M. Wood

Pennsylvania.—*Philadelphia:* H. M. WOOD appointed assistant chief mechanical officer—car. G. R. WEAVER appointed superintendent of equipment, Philadelphia Region, succeeding Mr. Wood. G. S. WEBB appointed assistant to chief mechanical officer, succeeding H. H. HAUPT, retired. *New York:* E. C. HANLY appointed superintendent of equipment, New York Region, succeeding Mr. Webb. *Altoona, Pa.:* A. R. MARSH appointed assistant manager heavy repair shops, succeeding Mr. Weaver. *Baltimore:* R. E. PINKHAM appointed superintendent of equipment, Chesapeake Region, succeeding Mr. Marsh. *Columbus, Ohio:* C. R. SEITZ appointed assistant enginehouse foreman, St. Clair enginehouse. *Pitcairn, Pa.:* F. R. WILDES appointed assistant enginehouse foreman. Formerly gang foreman, Juniata enginehouse. W. R. RILEY, inspector, appointed mechanical inspector.

Supply Trade Notes

ACF INDUSTRIES, INC., AMERICAN CAR & FOUNDRY DIVISION.—A $1,000,000 building is planned to house railroad car-cleaning and painting facilities at the Huntington, W. Va., plant. The present paint shop will be torn down for the new one-story building which will have approximately 63,000 sq ft of floor space.

■

EX-CELL-O CORPORATION.—Headquarters for sales and service personnel in the New York Area opened in a new building at 36 Commerce street, Springfield, N. J. *William M. Thompson* is district manager in charge of the new office. Assisting Mr. Thompson are *L. Graham Collins* and *Hebert H. Molk*.

■

DU PONT COMPANY.—*Roy A. Robichaud* appointed railway finishes representative, Atlanta regional sales offices, Finishes Division.

■

AMERICAN AIR FILTER COMPANY.—The New York City branch office and the Eastern Regional office moved to 292 Madison avenue, New York 17. *William F. Peters* is manager of the New York City branch office, and *C. J. Gaspar*, manager of Eastern Region.

Robert H. Beetle

Herbert H. Warren

AMERICAN BRAKE SHOE COMPANY.—*Robert H. Beetle* appointed chief engineer, Southern Wheel products, Railroad Products Division, at New York, succeeding *Robert A. Gow*, retired.

■

ELECTRIC STORAGE BATTERY COMPANY.—*Herbert H. Warren* appointed New York branch sales manager, succeeding John W. Weigt, retired.

■

WESTINGHOUSE AIR BRAKE COMPANY, AIR BRAKE DIVISION.—*W. W. Wagner* appointed representative, in charge of St. Paul office, succeeding *T. W. Baldwin*, retired.

■

C & D BATTERIES, INC.—*Power Operated Products*, headed by *Harvey J. Poplis*, appointed sales and service organization for C & D in Cincinnati.

■

HEWITT-ROBINS, INC.—*Beck & Blatchford, Inc.*, appointed transportation industry sales agents for Hewitt-Robins latex foam rubber and urethane foam products.

■

A. M. BYERS COMPANY.—*Robert J. Heister* appointed manager of Pittsburgh Division.

■

BEYER PEACOCK (HYMEK) LTD.—Beyer Peacock (Hymek) has been formed to unit the resources of Beyer Peacock, Armstrong Siddeley, and the Brush Group for the design and construction of diesel-mechanical and diesel-hydraulic locomotives. The new company is located at Locomotive House, Buckingham Gate, London SW1, England. The manufacture of the locomotives, however, will normally be undertaken by Beyer Peacock at its works at Manchester, England.

■

PENNSALT CHEMICALS CORPORATION.—Industrial Chemicals Regional office, formerly located in Alcoa building, Pittsburgh, moved to new quarters at Natrona, Pa.

■

UNITED STATES RUBBER COMPANY.—*Dr. Thomas L. Wilson* appointed manager Research Center, Wayne, N. J., succeeding *Dr. Arthur E. Brooks*, appointed an assistant director, research and development department.

■

WESTINGHOUSE ELECTRIC CORPORATION.—A manufacturing and repair plant, to serve railroads and other industries in Florida and southern Georgia, will be built by Westinghouse in Baldwin, Fla.

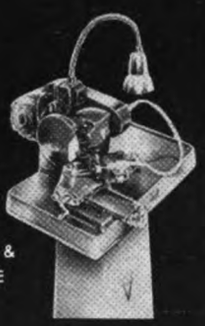
■

K. W. BATTERY COMPANY.—*Robert Rinehart* appointed midwest regional sales

HARTRIDGE

Specialized Test and Service Equipment for Precision Fuel Injection Maintenance

NOZZLE ANALYSER



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Builders of Specialized Diesel Equipment for Over 25 Years

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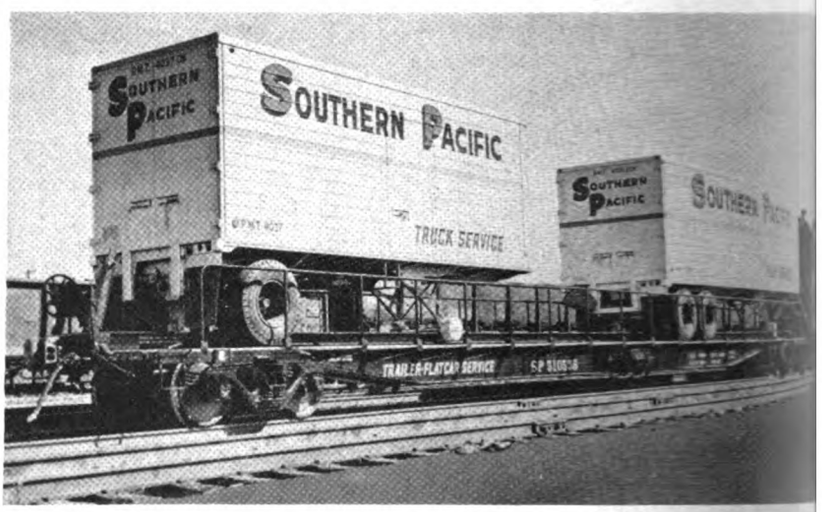
manager, Chicago; and *Donald R. Wickman*, eastern regional sales manager, Pittsburgh, succeeding Mr. Rinehart. *Arthur E. Wilson*, southeastern regional sales manager, appointed sales representative for Mississippi, North and South Carolina, Tennessee, Arkansas, and parts of Alabama and Georgia. *Gordon F. Koehler* appointed sales representative in Milwaukee area, and *John Schneider*, sales representative in the Toledo-Detroit area. *James G.* [illegible] pointed railroad representative in Va.

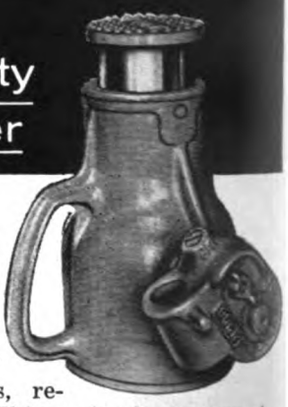
Obituary

HARRY E. MUCHNIC, founder man of the board, the Locomotive Material Company, died on June chison, Kan.



General American Transportation Corporation's Clejan type cars have been leased to the [illegible] Freight Company. This marks the first time forwarders will move freight extensively by pig[illegible] stead of conventional box car. SP now uses Clejan type cars on many runs in the west and [illegible] Republic Carloading has also contracted with General American for these 79-ft 6-in. cars wh[illegible] only 49,000 lb and can carry containers or trailers interchangeably.

WESTERN LOCOMOTIVE and CAR JACK lifts capacity loads easier



WESTERN has made the first major change in Locomotive and Car Journal Jacks by adding TIMKEN tapered thrust roller bearings, replacing ball bearings. This major improvement means reduced friction, greater speed, easier operation and less maintenance . . . available in 25, 35 and 50 ton capacities. Aluminum or malleable steel housings available in 25 or 35 ton models.

8018

Write for Bulletin No. 1957

WESTERN RAILROAD SUPPLY COMPANY

Division of Western Industries, Inc.

2742 West 36th Place, Chicago 32, Illinois

NATIONAL stopped this brush mix-up with one all-purpose brush grade!

C. F. EISELE

This railroad used a number of different brush grades of the same size on similar auxiliary motors of its freight units, says "National" Carbon Brush Man, Chuck Eisele.

Stocking the various grades was problem enough. Much worse was the danger of mix-ups — outfitting motors with the wrong brush grades.

By carefully analyzing work loads, Chuck Eisele was able to recommend *one "National" brush grade* to handle all auxiliary motors. The mix-up and stocking problems were solved completely.

Solving brush problems is a specialty of "National" Carbon Brush Men serving the nation's railroads. The men's training, backed by National Carbon *long term brush development*, make them your best consultants.

Call your National Carbon Brush Man or write to National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

"National", "N" and Shield Device, and "Union Carbide" are registered trade-marks of Union Carbide Corporation

NATIONAL CARBON COMPANY • **Division of Union Carbide Corporation** • **30 East 42nd Street, New York 17, N.Y.**

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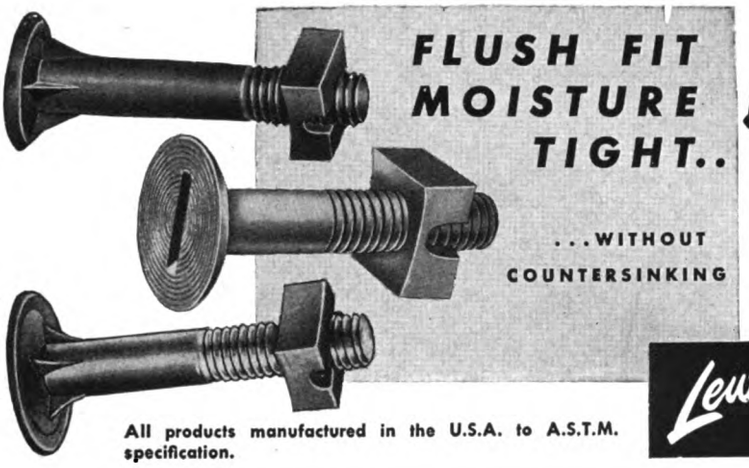

All products manufactured in the U.S.A. to A.S.T.M. specification.

Lewis sealtite car bolts

Each Lewis Sealtite car bolt has special "wood engineering" beveled head for flush, moisture tight, fit . . . without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning . . . slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

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—ADVERTISERS IN THIS ISSUE—

Adams and Westlake Co. 4
Allison Div. (Kar-Go Bearing) General Motors Corp. 12, 13
American Steel Foundries 54, 55
Arcair Company 82
Archer-Daniels Midland Co. 59

Baldwin-Lima-Hamilton Corporation, Hamilton Division 71
Bethlehem Steel Co. 14
Biddle Company, James G. 78
Broderick & Bascom Rope Co. 81
Buckeye Steel Casting Co., The 40

Chicago Pneumatic Tool Company 28

Demp-Nock Company 67
Diesel Injection Sales & Service 84
Duff Norton Mfg. Co. 74

Electro-Motive Division, General Motors Corporation 42, 43
Esso Standard Oil Co. 45

General Steel Castings Company 19
Griffin Wheel Co. 8, 9
Gulf Oil Corporation 16, 17

Hamilton Division, Baldwin-Lima-Hamilton Corporation 71
Hanlon & Wilson Co. 75
Hewson Company 75

International Nickel Company, Inc. 29

Journal Box Servicing Corporation 39
Joy Manufacturing Company 69

Lewis Bolt & Nut Co. 86
L. O. F. Glass Fibers Co. 26, 27

Magnus Chemical Co. 11
Magnus Metal Corporation 30
Mall Tool Co., Div. of Remington Arms, E. I. Dupont De Nemours & Co. 77
Metal Finishers, Inc. 82

National Carbon Company, Div. of Union Carbide Corp. 85
National Electric Coil Company 3
National Forge and Ordnance Co. 79
National Malleable & Steel Casting Co. 49, 52

Oakite Products Co. 78

Pullman-Standard Car Mfg. Co. 73

Research Products Manufacturing Company 21

Schundler & Co., Inc., F. E. 76
Sinclair Refining Company 22, 23
Snap-On-Tools Corporation 58
Speer Carbon Co. 6
Sperry Rail Service, Division of Sperry Products, Inc. 15
Sprague Devices, Inc. 67
Stackpole Carbon Co. 80
Standard Car Truck Company 25
Stran-Steel Corporation, Unit of National Steel Corporation 46, 47
Stratoflex, Inc. 83
Stucki Company, A. 75

Texas Company ..... Inside Front Cover
Timken Roller Bearing Co. ..... Back Cover
Toledo Pipe Threading Machine Co. 67

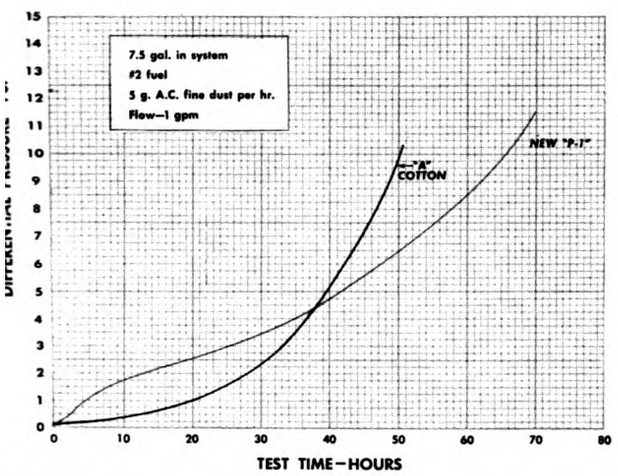
Union Carbide Corporation, National Carbon Company 85

Western Railroad Supply Co. 84
Wine Railway Appliance Co. 37
Wix Corporation ..... Inside Back Cover
Wyandotte Chemicals Corporation 7

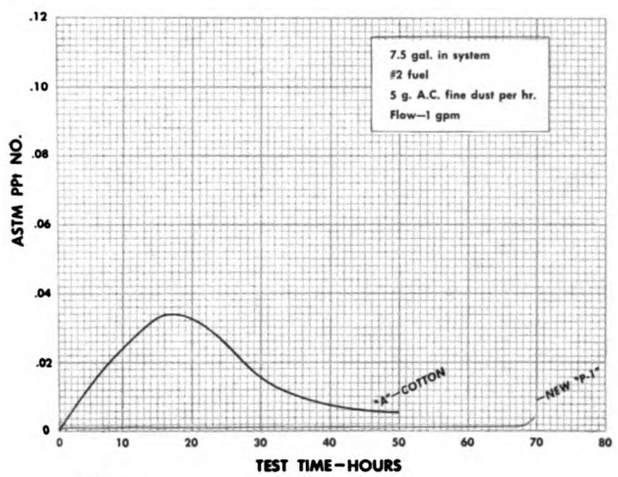
"This index is an editorial feature maintained for the convenience of readers. It is not a part of the advertiser's contract and Railway Locomotives & Cars assumes no responsibility for its correctness."

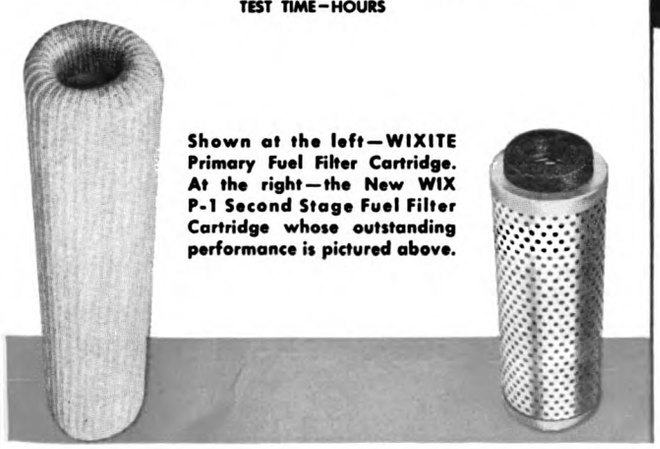
Applied Research in Filtration Saves Money for Railroads, too!

NEW CLEANLINESS IN FUEL AND LUBRICATING OILS EFFECTS MAJOR ECONOMIES IN DIESEL OPERATION



Test to demonstrate the comparative efficiency (retention of contaminants) and flow characteristics (pressure drop) of standard 2nd stage fuel filter cartridge "A" versus the new WIX P-1 pleated paper cartridge. With a condemnation limit of 10 psi, cartridge "A" indicates on the chart above a life cycle of 50 hours versus 66 hours for the new WIX development. Note that, throughout its longer service life, the WIX cartridge never exceeds trace amounts as opposed to the performance of cartridge "A" as shown on chart below.





Shown at the left—WIXITE Primary Fuel Filter Cartridge. At the right—the New WIX P-1 Second Stage Fuel Filter Cartridge whose outstanding performance is pictured above.

When a few specks, no larger than the point of a pin, can disrupt the entire schedule of a railroad system, the economic importance of clean fuel oil is well illustrated — but, in only one of its aspects. Engine trouble, caused by fuel failure, is a catastrophe. The day in and day out erosion of vital engine parts, which is the progressive penalty of contaminants in lubricating oil, may be equally costly. Combined, these problems represent significant sums in the annual operations budget.

Research and development by WIX, based on years of study, have made marked progress in the areas of both fuel and lubricating oil filtration. WIX Filter Cartridges were the first to supplant the old hand-filled waste packed filters which today are pretty generally recognized as "extravagant" economies.

Today WIX offers comprehensive coverage of all oil filtration needs on diesel locomotives . . . lubrication, primary and secondary stage fuel. This coverage embraces many filtering media so that engineering can prescribe the precise filtering formula to suit the engine and its characteristics as well as the service or environment in which it operates.

WRITE:

Get the facts on new developments in WIX Engineered Filtration and the new WIX Railroad Filter Catalog.

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How railroads can plan now to s
saving 288 million dollars a yea

THE railroads' savings in maintenance and operating costs will soar to an estimated $288,000,000 a year—about $144 per car—when all freight rolls on roller bearings. Is there a railroader anywhere who doesn't dream of such savings? And this is no dream! It's a logical first step in railroad improvement because the American railroads are no better than their rolling stock.

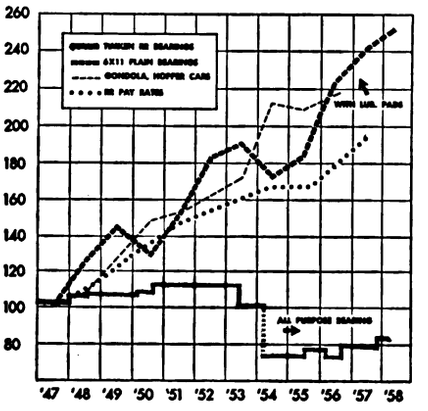
The railroads have been trying to speed this big switch to "Roller Freight"—and we've done our best to help. We've made "Roller Freight" more and more practical. Today, the extra cost of equipping a freight car with Timken® roller bearings is almost 50% less than it was just 10 years ago. At the same time, the cost of friction bearings and other things the railroads buy has been going way up (see chart right)—the price gap has been greatly narrowed.

Today we're putting revolutionary production techniques to work to help cut our manufacturing cost. We've built a whole new manufacturing line in Columbus, Ohio just to produce freight car roller bearings—20,000 car sets every year. It's a $7 million investment showing our faith in the future of the railroads. This new facility is designed to meet the demand of a regular, planned "Roller Freight" program. And, if railroads make the most of it, costs can be kept down.

Here's just one idea on how to make the most of this new plant.

Each railroad could plan to put a certain percentage of its freight cars on roller bearings every month

TIMKEN BEARING COSTS HAVE STAYED DOWN WHILE OTHER RAILROAD COSTS HAVE SKYROCKETED (INDEX 1947 = 100)



SOURCES: AMERICAN RAILWAY CAR INSTITUTE • INDEX FROM AAR—ICC STUDY — AAR INTERCHANGE RULES

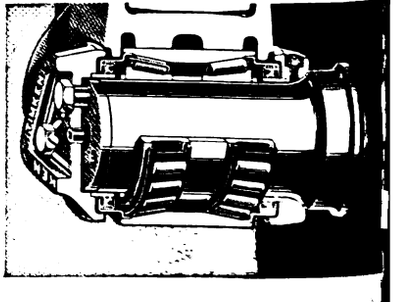
or every year. By doing this, all the railroads would share in the benefits of conversion to roller bearings. And by putting these cars in interchange, they would share the benefits because they'd stand to *get back* through the interchange system about as many "Roller Freight" cars as they'd *put* in interchange. And a steady demand for roller bearings would automatically keep bearing costs down.

By making it practical to start right now buying roller bearings—the bearings that all the railroads *want* to use sooner or later anyway—the railroads will be off and running to a new Golden Age. Eventually, every single freight car in America will be roller-bearing-equipped.

These "Roller Freight" cars will attract thousands of new customers because you'll be able to *guarantee* faster, more dependable shipping. Your manpower will become more productive. Your bearing
nance and operating costs wil
reduced to rock-bottom levels.

Savings can start right away. E
car put on Timken roller bearin
will mean eight fewer potential h
boxes to worry about. Each car
Timken bearings will take only
fraction of the present time need
for terminal bearing inspection
And each car on the new Timk
"AP" bearings produced in
new plant will go at least thre
years without adding lubricant. Ask
your engineers and the people
your mechanical departments about
the job "Roller Freight" can d
for you.

And why not talk over your own
ideas for planned roller bearing
conversion with your railroad
friends. Start the "Roller Freight"
cars rolling now. Start switching
to Timken tapered roller bearings
for your freight cars. The Timken
Roller Bearing Company, Canton
Ohio. Canadian plant: St. Thom
Ontario. Cable: "TIMROSCO".



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"Roller Freight" is the next great step in railroading

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Flange Lubrication on the Reading . . . . Page 26

OCT 1 5 1958

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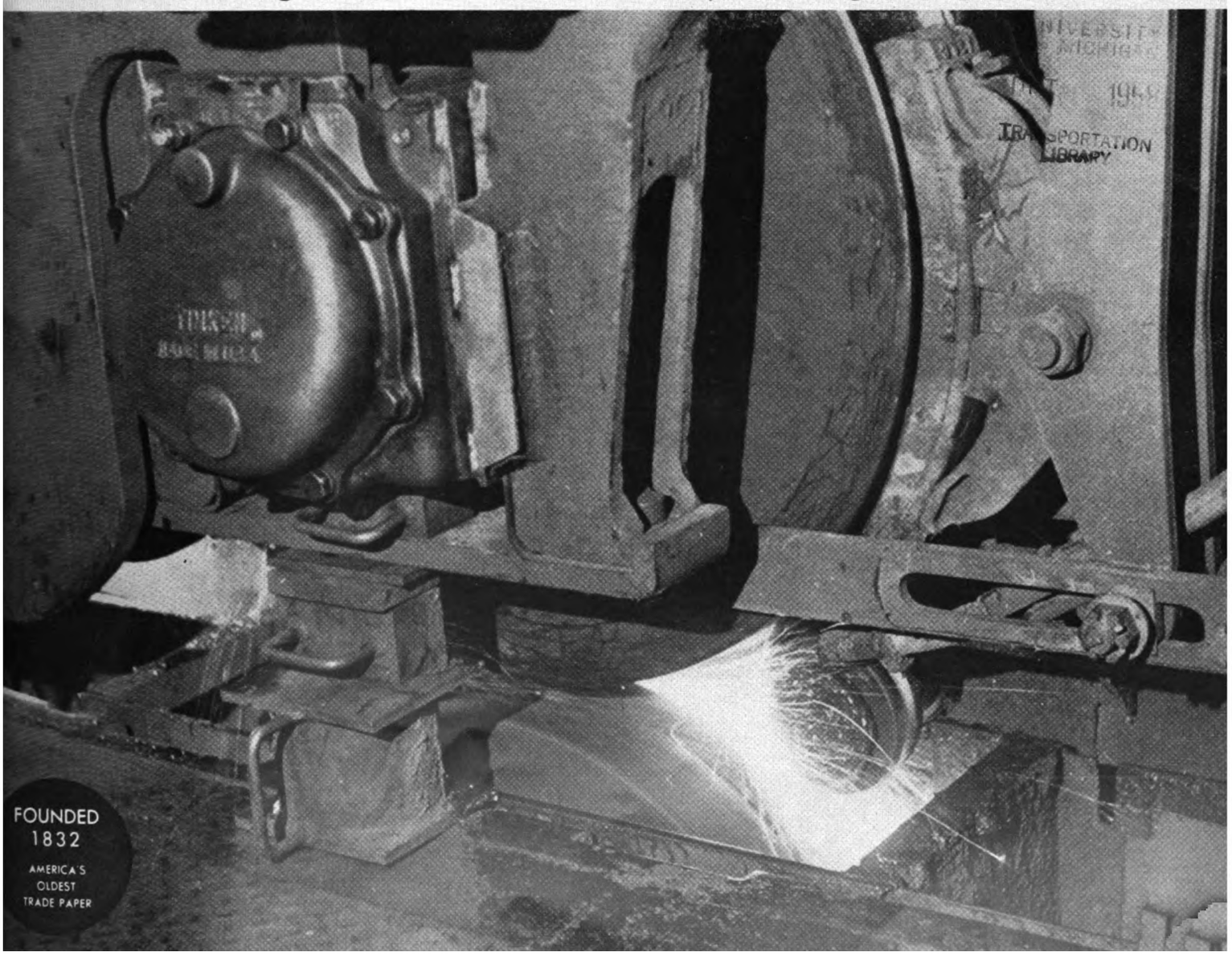
Long Island Modernizes Its Shops . . . . Page 46



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The splendid service records of more than 60,000 yokes testify to the correctness of the design and quality of the material used in these Miner Yokes.

An ingenious interlocking feature securely unites the yoke to the coupler and holds them in correct relationship.

Two vertical ties at the front end of yoke ensure full strength and safety.

Exceeds AAR strength requirements.

For 24⅝" gear pocket D-8909—AAR-B-99
For 18½" gear pocket D-8911—AAR-B-100

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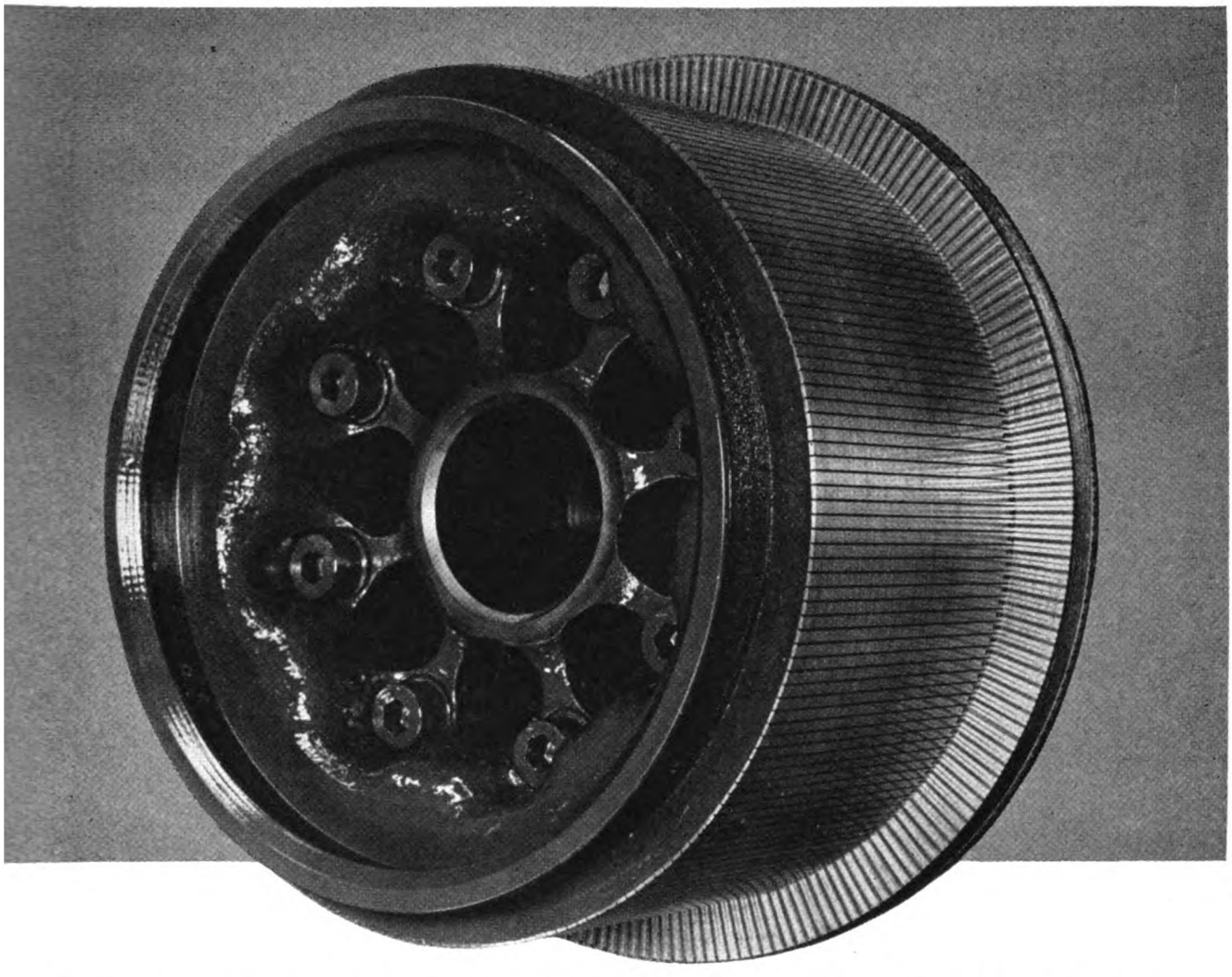

NATIONAL commutators for traction motors

guarantee excellent performance because...

1. Archbound construction holds segment mica in place by compression. It puts all the steel V-ring pressure radially inward on the 30° cone, wedging one commutator bar against the other in keystone fashion.
2. Mica V-rings bonded with epoxy blended resin withstand higher temperature and speed.
3. High silver content copper alloy bars operate at elevated temperatures without softening.
4. Segment mica is epoxy bonded to prevent breaking and throwing out of risers.

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COLUMBUS 16, OHIO, U. S. A.

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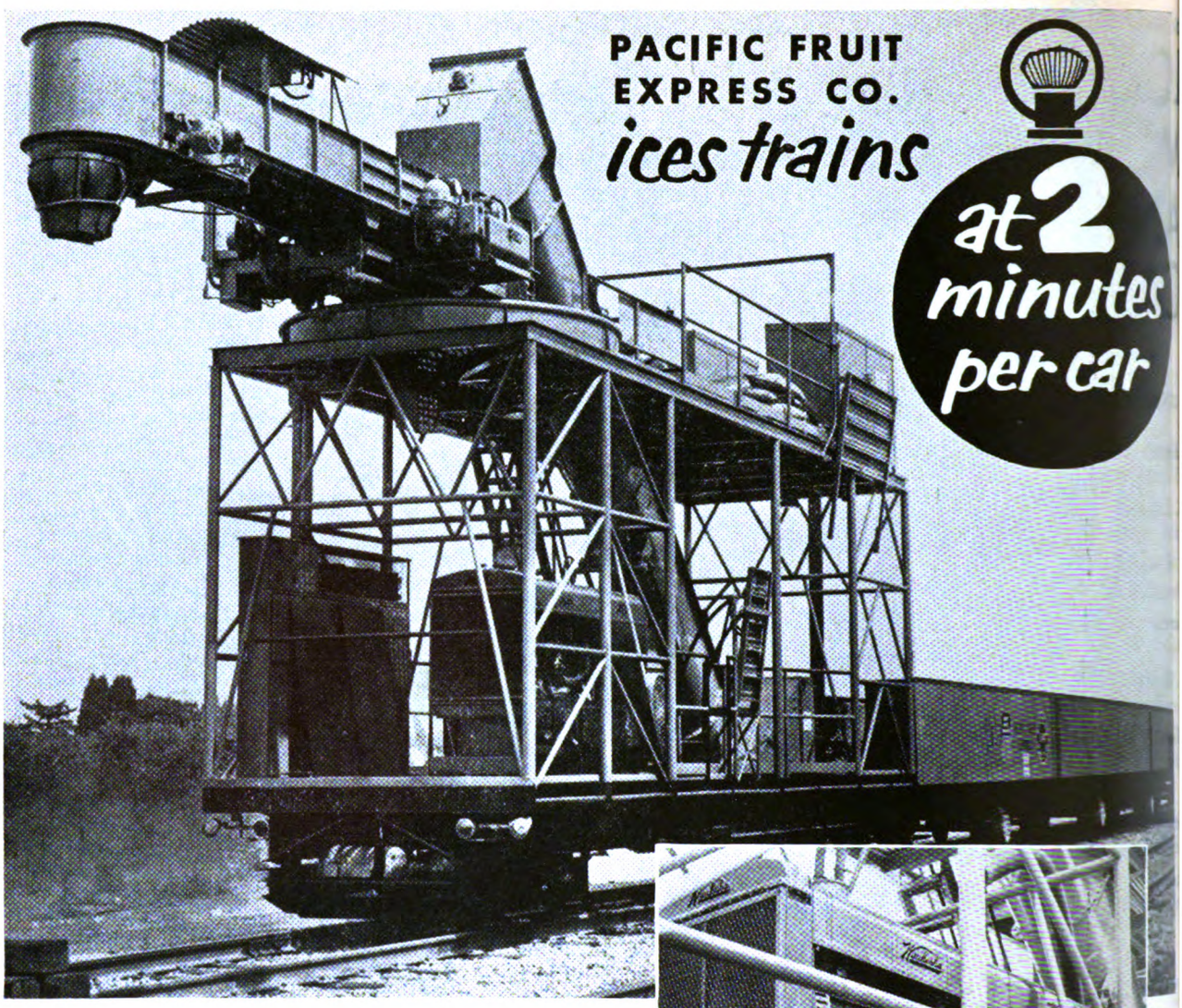
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES



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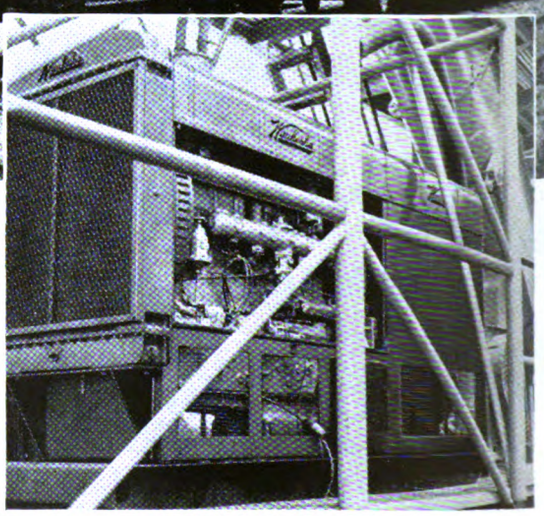
ENGINATOR® powers Car Icing Machine Unit



Moving on a track alongside refrigerated car trains . . . no icing platform needed . . . this mobile icing machine unit ices cars on either side. So flexible is its extending or retracting snout, that four hatches of adjacent ends of two cars can be iced from one position. With four men, a train is iced at two minutes per car.

This Waukesha-Enginator-powered mobile unit is speeding the icing of the Pacific Fruit Express Co. cars at Eugene, Oregon. Its head-end 4-wheel tractor carries the power plant and icing machinery; and the four 4-wheel trailers haul a total of 60 tons of ice in 300 lb. blocks.

On the tractor is a Waukesha 100 KW Enginator (a gasoline engine operating at 1800 rpm direct-connected to a 240/480 AC 3-phase 60-cycle generator). It powers controls (in cab on snout), ice breaker and elevator delivering ice to snout, also chain elevator (through trailers) which feeds ice to breaker. Breaker makes coarse or fine ice, which is salted at the top platform. Waukesha Enginators for gas, gasoline or Diesel fuels are available in 50 to 800 KW capacities. Send for descriptive bulletins.

392

RAILWAY DIVISION WAUKESHA MOTOR COMPANY · WAUKESHA, WISCONSIN

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Germany.

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ASTER-SEND FORM 3579 TO EM-, BRISTOL, CONN.

REPORT FOR OCTOBER

The Chicago & Eastern Illinois' "Eliza Doolittle" is the 1,000th diesel locomotive to go through the upgrading process of Electro-Motive Division of General Motors at La Grange, Ill. New and upgraded components transformed a 12 year old E-7 unit that had run 1,600,000 miles to the new E-9 unit with 2,400 hp and new locomotive warranty.

Charges for Application of Journal Lubricating Devices

Following a study made by the Committee on Prices for Labor and Materials, the AAR Mechanical Division is suggesting a price schedule for the application of various journal lubricating devices to foreign and private line cars if the railroads and private car owners voluntarily subscribe to the plan. Many private car owners are agreeable to having railroads install these devices when cars are due for periodic lubrication attention. The suggestion reads:

"Journal Boxes: Periodical attention, including jacking, removal and examination of all journal wedges and bearings, removal of waste packing and replacing with journal lubricating devices and stenciling car, job completed in all details as outlined in AAR Lubrication Manual, per car, excluding ma-

(*Continued on page 7*)

TIME SAVING IDEAS FOR OCTOBER

MOTIVE POWER AND CAR

Santa Fe Builds 100 'Shock Control' Cars 21
Standardized Hoppers Have Been Completed 22
How SP&S Cleans Diesel Wheels 23
New Methods for Handling Grain 24
Flange Lubrication Cuts Rail Wear 26
Coordinated Mechanical Association Reports 27
Diesel Repair Time Savers 43

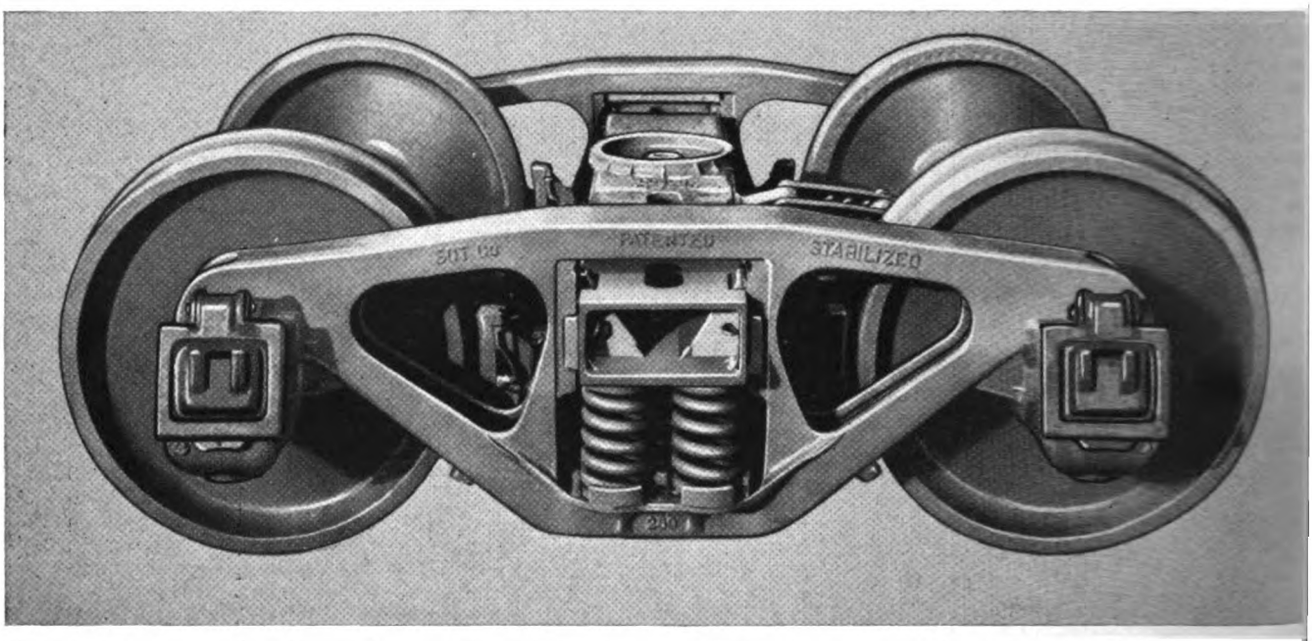
ELECTRICAL

Long Island's Dunton M-U Shop 46
Maintenance Is the Key 51
Could Bill Sparks Have Done Better? 51

DEPARTMENTS

Personal Mention 7
Supply Trade Notes 7
What's New In Equipment 10

Experienced Car Builders BEGIN WITH



BARBER
STABILIZED TRUCKS

Today's heavier, high speed railroading demands years ahead freight car performance. Better design, better quality from rail to roof can achieve it. So, "Begin with Barber Stabilized Trucks." You provide a smoother ride, with variable friction for variable loads... protect other equipment and save on lading damage claims. Proof—*more than 475,000 Barber car sets sold*... none has ever worn out!

Standard Car Truck Company, 332 South Michigan Avenue, Chicago 4, Illinois. *In Canada:* Consolidated Equipment Company, Ltd., Montreal 2, Quebec.

EPORT FOR OCTOBER—*Continued from page 5*

l cost of lubricators as follows: 8-in.—95, 9-in.—14.70, 19-in.—16.45, 11-in.—5. In case where lubricators are furnished car owner, no additional charge is in r; however, where lubricators are taken stock of repairing road, additional ge should be made per Rule 105."

his schedule is suggested for use on an im basis. When more experience is ob-d, it might be possible to include pro-ns in the Interchange Rules for this work. e may be some cases where parties sub-ing to this plan may wish to negotiate own basis for charges. In the absence special agreements, the AAR feels it ld be entirely equitable to use the above dule. The charges would remain in effect l economic conditions might change one nore of the cost factors. They would then eviewed by the Price Committee.

is to be understood that this price sched-could be used in all cases where either ate car lines or railroads wish to sub-e to this plan. Where a priva'e car line railroad not having done so wishes to norize railroads in general to install specific types of journal lubricating devices to its cars when due for periodic attention, the AAR Mechanical Division office should be notified. Circulars would then be issued at appropriate intervals to make this known to all concerned.

Orders and Inquiries for New Equipment

Placed Since the Closing of the September Issue

Freight Cars

Road and builder	No. of cars	Type of car	Cap, tons	Other detail
CHICAGO & NORTH WESTERN:				
Pullman-Standard	1,000	Box	--	40-ft. 6-in. all-steel cars with 8-ft. doors. Deliveries to begin Oct. 20 at about 90 cars per week. Cost estimated at more than $7 million.
MISSOURI-KANSAS-TEXAS:				
General American	20	Covered hopper	—	Airslide. Delivery late this year.
MISSOURI-PACIFIC:				
General American	50	Covered hopper	70	Airslide. Delivery to begin this month.
Company shops	600	Box	50	Under construction.
TRAILER TRAIN CO.:				
American Car & Fdry.	200	Flat cars	—	Cars (400) to be 85-ft.; equipped with roller bearings, rubber cushioned draft gears, and built-in semi-automatic devices for securing trailers to cars. For delivery November and December.
Pullman-Standard	200	Flat cars	—	
UNION PACIFIC:				
Company shops	100	Cabooses	—	Cost, approx. $1.9 million. Construction to begin in November.

alph O. Johnson
M-K-T

E. W. Kettering
General Motors

David M. Lyon
General Motors

Harold M. Nelson
North American Car

Eustace Lingle
Oakite

Henry V. Bootes
ACF Industries

ersonal Mention

adian National.—*Montreal:* H. L. McCAGG ointed mechanical engineer (diesel).

:ago, Milwaukee, St. Paul & Pacific.—*Seattle, sh.:* H. R. MORGAN, assistant electrical ineer, appointed electrical engineer, suc-ling E. C. BARNES, deceased. *Tacoma, sh.:* D. D. FISHER appointed district gen-car foreman, *Bensenville, Ill.:* W. C. UER appointed district general car foreman, eeding Mr. Fisher. *St. Paul, Minn.:* V. L. TERWORTH appointed district general car man, succeeding Mr. Mauer. *Savanna, Ill.:* F. SHANNON appointed district general car man, succeeding Mr. Waterworth. *Mil-kee Terminal:* H. R. ANDERSON appointed rict general car foreman, succeeding Mr. nnon. Headquarters, Davies Yard.

—*Marion, Ohio.:* HARRY I. PHELPS, ter mechanic, retired.

it Northern.—*St. Paul, Minn.:* DONALD F. RSTON, mechanical assistant, appointed mechanical engineer, succeeding WILLIAM C. MILLER, retired.

Missouri-Kansas-Texas.—*Parsons, Kan.:* RALPH O. JOHNSON appointed chief mechanical officer, succeeding HARRY S. TURNER, retired. Mr. Johnson formerly assistant chief engineer, communications and signals, at Denison, Tex.

New York, Chicago & St. Louis.—*Calumet, Ill.:* CARL L. MILLER appointed general engine-house foreman.

Pennsylvania.—*Baltimore, Md.:* A. O. TAYLOR appointed superintendent of equipment, Chesapeake region. *Altoona, Pa.:* H. S. MILLER appointed superintendent locomotive shop, succeeding Mr. Taylor. Mr. Miller formerly master mechanic, Columbus, Ohio.

Southern.—*Winston-Salem, N.C.:* JAMES A. CRENSHAW, appointed general foreman. Formerly assistant foreman enginehouse at Columbia, S.C. *Rock Hill, S.C.:* JOHN H. W. MILLER appointed general foreman. Formerly general foreman at Winston-Salem. *Birmingham, Ala.:* JOHN I. VARDAMAN, JR., appointed road foreman of engines.

Supply Trade Notes

GENERAL MOTORS CORPORATION, ELECTRO-MOTIVE DIVISION.—*E. W. Kettering* has been named to the newly created post of research assistant to the general manager. *David M. Lyon* has been appointed director of research. Mr. Lyon was previously executive research engineer.

■

NORTH AMERICAN CAR COMPANY.—*Harold M. Nelson* appointed assistant vice-president—mechanical. Mr. Nelson previously general mechanical superintendent, Fruit Growers Express Company.

■

OAKITE PRODUCTS, INC.—*Eustace Lingle,* vice-president, named vice-president in charge of industrial sales and education.

■

ACF INDUSTRIES, INC., SHIPPER'S CAR LINE DIVISION.—*Henry V. Bootes,* executive

(*Continued on page 60*)

Photo at left was taken twenty years ago when the FT freight locomotive was introduced. Now, after millions of miles of service, this FT can be turned in on the purchase of new General Purpose units like the one shown above. Besides gaining increased capacity, the new units carry the same warranty, low maintenance and operating costs as completely new locomotives.

Increased capacity for faster schedules

Turning in old FT freight locomotives for new General Purpose locomotives containing certain remanufactured components is providing railroads with an important "extra" dividend—increased capacity without increasing the locomotive fleet!

For example:

At this speed mph	it takes this number units FT	New GP9	to haul this tonnage
30	4	3.03	9,933
40	4	2.97	5,909
50	4	2.89	3,637
60	4	2.79	2,328

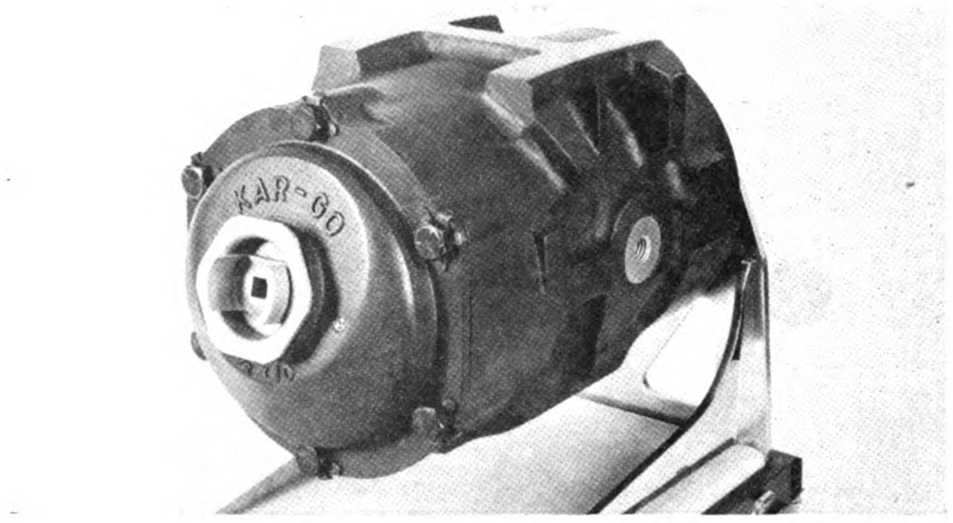
Three of the new GP9 units do the work of four FT units. A gain in capacity of *one additional* GP9. This method of gaining new power can be put to advantage on your road. For details, call your Electro-Motive representative.

GENERAL MOTORS LOCOMOTIVES

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS

LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*

In Canada: General Motors Diesel Limited, London, Ontario



Sleeve-Type Journal Bearing

The Allison Kar-Go sealed journal bearing has been redesigned so it can be applied to roller-bearing axles. The improved unit also will fit AAR approved integral side frames modified for roller bearing applications. Other changes include redesign of the malleable iron housing to include the wedge. The cover has a large oil filler plug for better filling and easier oil-level inspection.

The bearing, now in quantity production, successfully completed initial laboratory tests in 1955. The original design has accumulated nearly 75 million unit miles on 38 American and Canadian railroads. During the three year tests, bearing inspections averaged only one every 20,000 miles in many applications. Oil additions are said to be averaging less than a pint each 75,000 miles. *Allison Div., General Motors Corp., Dept. RLC, Indianapolis, Ind.*

Journal Lubricator Cleaner

This Triplex cleaning unit, adapted for cleaning journal lubricators, is said to clean from 18 to 24 dirty lubricators per hour. Added to the washer and extractor is an automatic oil heating device with temperature regulation, using either steam or electric immersion heater. Pumps, valves and filter are designed to handle the heavier car oil.

Dirty pads are placed in the washer (left tub) for about 10 min to remove dirt, lint and water. Hot oil at 240 deg is continuously circulated through the tub, then filtered and returned to the storage tank in the rear of the unit. The reversible agitator in the tub is gear driven. After the oil bath, pads are run for about 7 min in the 15-in. high-speed extractor (right tub) for maximum oil extraction. The spinner is driven by a motor below the basket, through a flexible shaft and overhead friction drive. The friction drive allows spinner basket to be stopped by hand pressure for greater safety when unit is run by inexperienced operators.

According to the manufacturer, the unit has proved efficient, easy and inexpensive to operate and sturdy enough to withstand heavy-duty use. It is eligible for Underwriter's Laboratory approval. *American Laundry Machinery Company, Dept. RLC, Ross & Section aves., Cincinnati 12.*

Roller Bearing Grease

Gulfcrown RR, a lithium-soap-base material, is one of the first greases for roller bearing lubrication to be approved under AAR Specification M-917-56. It showed no evidence of high temperature rise within the bearings. Subsequent tests revealed that the Gulfcrown Grease RR retained oxidation stability and did not soften. Gulfcrown RR also proved its compatibility with AAR-approved greases.

The new grease, with a typical consistency of No. 0, is compounded with refined [illegible] an oxidation inhibitor. Corrosion protection is provided by additives with effective rust properties. Its hard freezing point minus 50 deg F. The grease pumps from 0 deg F, won't thin out at high speeds, resists washing action of water. It is available in 35-lb pails and 100- and 400-lb [illegible] *Gulf Oil Corp., Dept. DM, Dept. RLC Building, Pittsburgh 30.*

Panel Type Oil Bath Filter

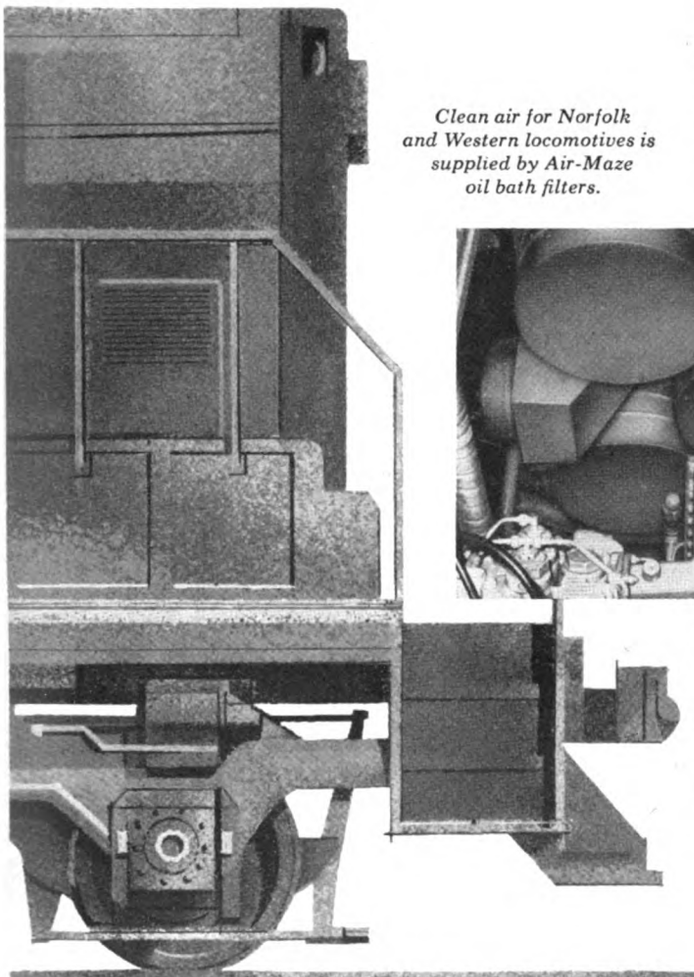
This panel type, oil-bath, engine air [illegible] built specifically for railroad use, can be applied to existing vertical panel adapters on diesel engines. Dust arresting efficiencies are said to be in the range of 90 per [illegible] The unit incorporates principles of oil wetting and cleaning of media used on other Maze oil-bath filters. The Panelbath, built for operating conditions varying from 400 to 1,750 cfm, provides high dirt removal efficiency at a maximum pressure drop of approximately 5-in. of water. The Panelbath, designed for use where dust concentrations are moderate, mounts on the conventional vertical panel adapters and only requires the installation of four holding clamps.

Under normal dust conditions, servicing of the filter involves periodic checking of the oil level and the occasional draining and refilling of a 5-qt reservoir with conventional SAE engine lube oil. Intake air is drawn through the front grill and divided into two flows. One flow is directed to the media; the second flow is directed through an oil control trough, picking up oil droplets and carrying the droplets to the filter media, creating a wetting action. The intake air deflects a calibrated baffle. At idle speeds the baffle is closed, insuring the required air to be deflected through the oil control trough. As the oil drains from the media, the oil carries impinged dirt particles to a sump at the bottom. The oil then returns to the reservoir where the circulating cycle is repeated. *Air-Maze Corp., Dept. RL, 25000 Miles Road, Cleveland 28.*

(Turn to page 12)

Service on Norfolk and Western shows:

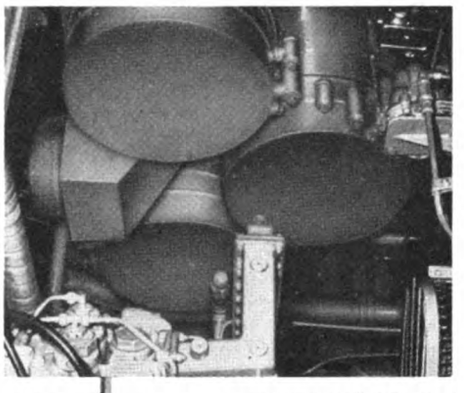
AIR-MAZE OIL BATH FILTERS GIVE LONG POWER ASSEMBLY LIFE



Clean air for Norfolk and Western locomotives is supplied by Air-Maze oil bath filters.

The first Air-Maze oil bath filter installed on the air intake of a Norfolk and Western 1800 hp Alco diesel locomotive equipped with the Model 251 engine was placed in service in 1956. 140 N & W locomotives are now equipped with Air-Maze oil bath filters.

The reasons for using Air-Maze filters are clear. After two years of heavy freight service, one of the 1800 hp locomotives was brought into the Roanoke Shop for inspection. This is what the inspection showed:



1. Pistons and rings in excellent condition. Ring and groove wear minimum. Rings free, none broken or bald. Crowns of pistons clean with normal buildup.
2. Chrome-plated cylinder liners showed negligible wear.

As a result of this inspection, overhaul period has been appreciably extended. Maintenance calls for draining and refilling oil bath filter every 90 days, cleaning annually.

For details, contact your locomotive builder or the Air-Maze Corporation, Cleveland 28, Ohio.

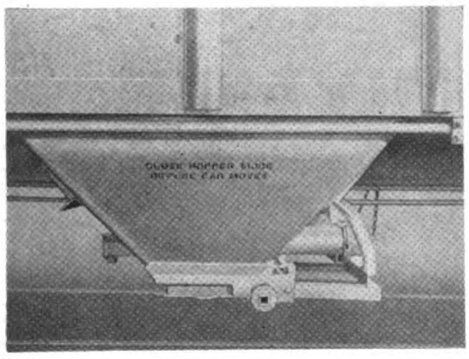
CLEARED TO PROGRESS P R I MEMBER

The biggest names in diesels are protected by Air-Maze filters

AIR-MAZE
The Filter Engineers

ENGINE AIR FILTERS • CAR BODY FILTERS • LUBE OIL FILTERS • OIL SEPARATORS • PASSENGER CAR FILTERS

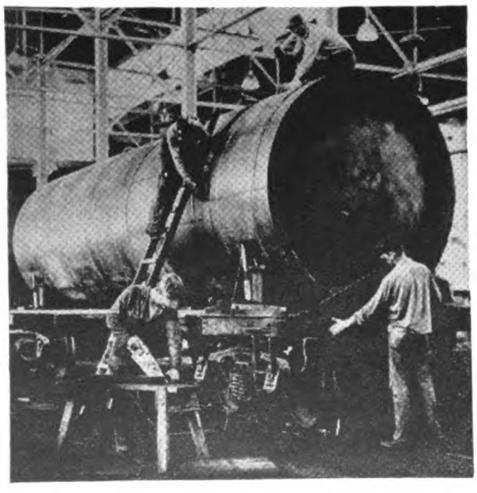
WHAT'S NEW IN EQUIPMENT—*Continued from page 10*



Pneumatic Outlet

This newly developed pneumatic valve, combined with the Enterprise cast steel frame and gate, offers a choice of two unloading systems for covered hopper cars—the conventional gravity-flow bottom discharge and pneumatic conveying. Designed for sanitation, and easy unloading of dry granular or powdered commodities, it can be used with any type or size of vacuum system. The valve can be applied to existing hoppers or new cars.

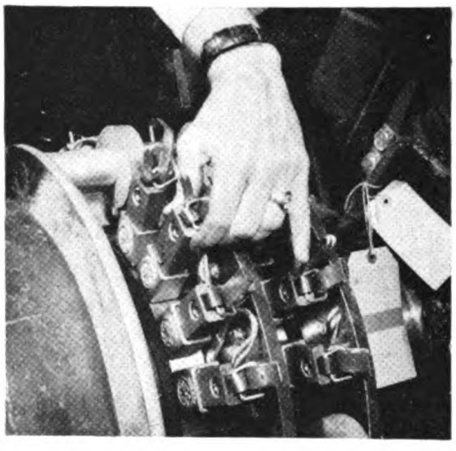
The outlet consists of an atmospheric air inlet valve and a lading outlet valve. A 50-deg angular air-stream conduit of 3/16-in. steel plate is placed longitudinally in the hopper to provide a bridge between the inlet and outlet valves. The bottom edges of the conduit are located ½ in. above the sliding discharge gate. When a pneumatic system is connected to the outlet valve, an air stream is created in the hopper bridge circuit drawing the lading through the ½-in. opening between the conduit and the sliding gate and through the outlet valve and conveyor system to the storage bin. *Enterprise Railway Equipment Company, Dept. RLC, 59 East Van Buren st., Chicago 5.*



Insulation Material

Rubatex Insulated Hardboard has been used by Union Tank Car to insulate a group of railroad tank cars for transporting liquid carbon dioxide. Blocks of 2-in. thick Rubatex, 27 x 54 in., were fabricated to fit the tank-car contour. A cold adhesive was employed. No vapor barrier was used because the rubber material does not absorb moisture.

The material has also been used in refrigerator cars. It is said to have the lowest coefficient of thermal conductivity of any structural material known. Based on plioflex synthetic rubber, millions of tiny nitrogen filled cells are dispersed in a matrix of the rubber. *Rubatex Div., Great American Industries, Inc., Dept. RLC, Bedford, Va.*



Carbon-Brush Holder

A carbon-brush holder, consisting of a one-piece die casting and coiled spring, is said to eliminate the need for periodic adjustment of brushes and greatly reduce excessive or destructive sparking, minimizing both brush and collector ring wear.

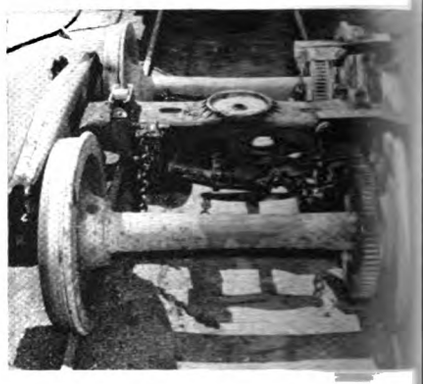
For direct-current equipment, the holder has an easy vision inspection window. When the brush rivet appears in the opening, it is time to replace the brush. Pressure is automatically held constant against the commutator at all stages of brush wear.

The holders can be substituted or adapted for use to replace old pin-adjusting holders on presently installed alternating- or direct-current motors and generators. They are said to give up to 50 per cent longer wearing length. Changing brushes in this constant-pressure holder requires three or four simple steps. *Large Motor & Generator Dept., General Electric Company, Dept. RLC, Schenectady, N.Y.*

Disc Freight Brake

A truck-mounted package, the Frate Brake differs from the Budd disc passenger brake only in certain mechanical features. For all but the heaviest freight cars, there would be only one of the 24-in., double-surfaced braking discs per axle. While in the application shown the brake units are supported from the truck side frame, it is believed that most applications would be made to the bolster because this simplifies wheel changes. In either case, the brake units are supported by hangers attached to cantilever brackets.

Because of the lateral in the freight-car truck, it was necessary to depart from long-lever principle of the passenger and use a C-clamp design with fixed movable jaws. The fixed jaw, supporting outer brake shoe, becomes the main member of the carriage supported by the truck. The movable jaw, supporting the inner brake shoe, is carried by a lever fulcrumed on carriage and actuated by an air-operated cylinder—or actuator—also mounted on carriage. A guide link paralleling the load arm of the lever takes most of the vertical brake reaction of the movable shoe and at the same time forms one side of a parallelogram—a four-bar link mechanism designed to keep the movable shoe parallel to the disc in a horizontal plane. This link also keeps the shoes aligned in a vertical plane. The shoe lining differs from that on passenger car brakes because it is necessary to compensate for the weight variation of freight cars and so that the braking action will be compatible with tread brakes. The actuator consists of a pressed-steel air cylinder which has a diaphragm instead of a packed cup and piston. *Railway Division, Budd Company, Dept. RLC, Philadelphia.*



Air Tools

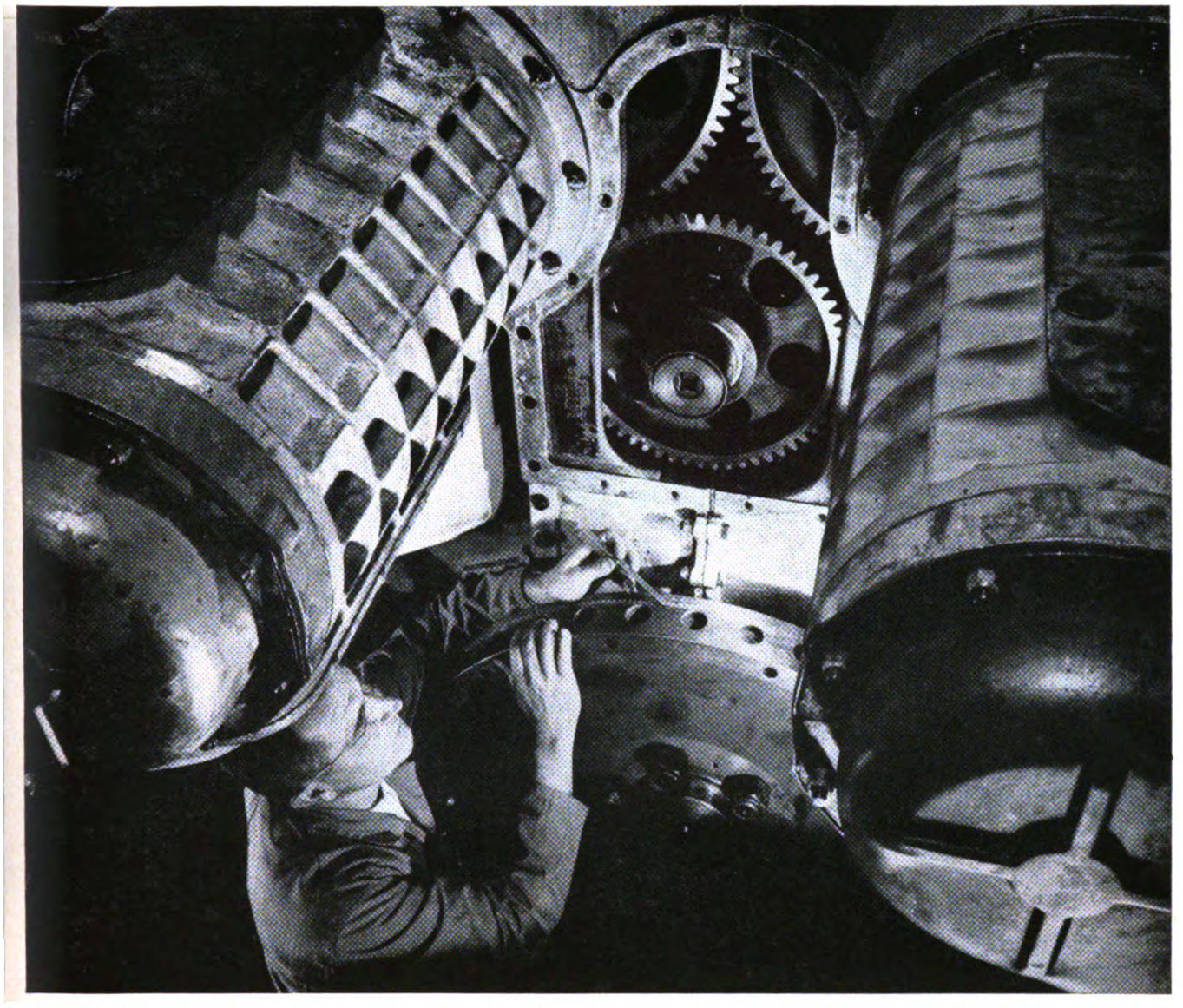
Two air-powered Impactools, size 50[illegible] Torque Control Impactool (50 to 150-[illegible] range) and size 5081 Impactool for [illegible] running jobs up to 5/8-in. bolt size, have [illegible] balanced throttle valves for easily con[illegible] throttle graduation and trigger pull. Mot[illegible] is designed so the operating air passes thro[illegible] three expansion chambers which elim[illegible] exhaust noises. Reversing is done by sh[illegible]

(*Continued on page 58*)

ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL RR

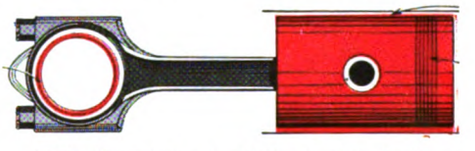
FIRM NORTHERN PACIFIC RAILWAY
South Tacoma, Wash.



RR diesel gears show only ½° wear in 2½ million miles

Timing gears on this Northern Pacific GMC-diesel locomotive engine, lubricated with RPM DELO Oil RR, recently completed 2½ million miles of severe freight service without repairs or adjustment. NP's South Tacoma Shop Foreman, A. R. Genin (above), indicates degree marks on engine flywheel, used to gauge gear wear. Tolerance between gear teeth shows variance of just ½° from original setting. Mr. Genin says, "We consider this low rate of wear remarkable for heavy-duty freight operation. It is typical of our experience during the 12 years we have used RPM DELO Oil in all our locomotive diesels." Engines are 1350 h.p. 16-567 series.

Why RPM DELO Oil RR reduces wear, corrosion



• Oil stays on engine parts—hot or cold, running or idle • Anti-oxidant resists lacquer formation • Detergent keeps parts clean • Special compounds prevent corrosion of bearing metals • Inhibitor resists foaming.

about RPM DELO Oils or other petroleum products of any kind, or the name and address of your nearest distributor, write or call any of the companies listed below.

LUBRICATING OILS RPM DELO

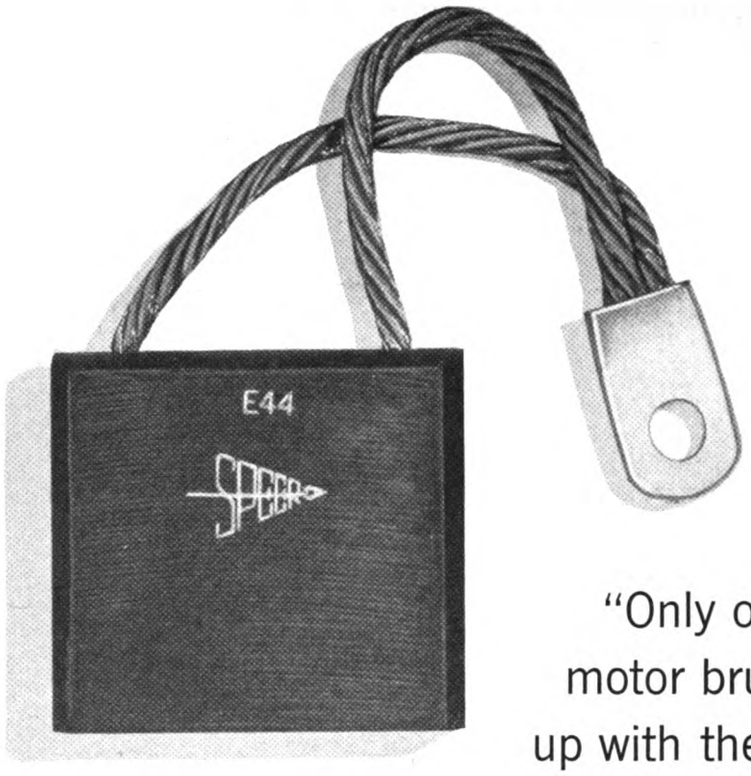
TRADEMARK "RPM DELO" AND DESIGN REG. U. S. PAT. OFF

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20

THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

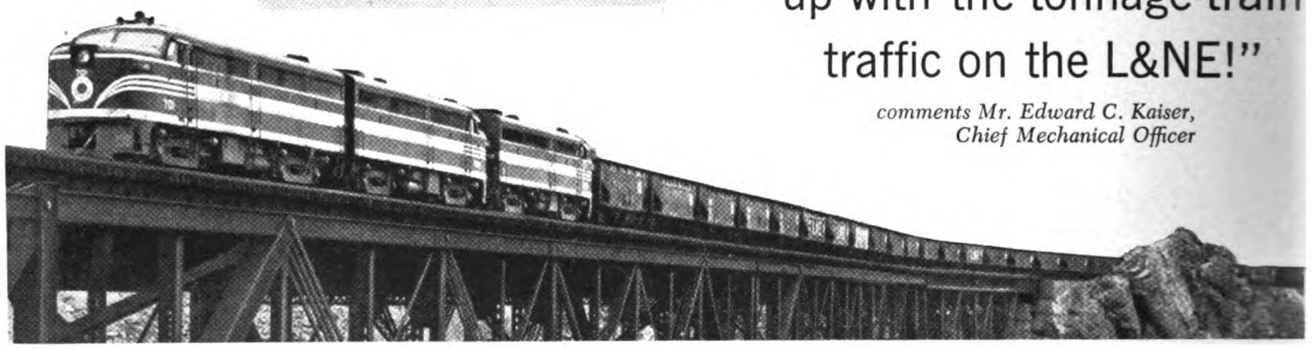
STANDARD OIL COMPANY OF TEXAS, El Paso

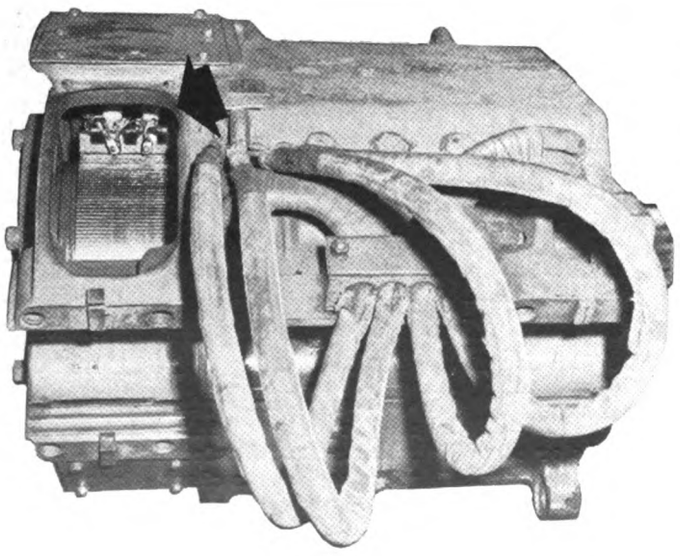
THE CALIFORNIA COMPANY, Denver 1, Colorado



"Only one traction motor brush can keep up with the tonnage-train traffic on the L&NE!"

comments Mr. Edward C. Kaiser, Chief Mechanical Officer





"The Lehigh & New England is an all-freight railroad," Mr. Kaiser continues. "Tonnage trains that put peak loads on motive units are the everyday story. Grades as steep as 2.4 and sharp curves mark the contour of the line – a combination that requires lots of dynamic braking.

"When you turn a traction motor into a generator at the operating speeds and loads prevailing on the L&NE, the brushes have to be able to take real punishment."

Experience has taught the L&NE that SPEER Brushes were the only brushes tried by it that could take this treatment—and stand up. "We have used SPEER Traction Motor Brushes (grade E-44) exclusively for over four years on all road units and road and yard switchers." Mr. Kaiser concludes, "It is the only brush that has stood up satisfactorily."

We can't think of a better endorsement for the brushes that have proved themselves in millions of miles of this kind of railroad service. SPEER builds a complete line of high-performance brushes for every railroad application. If you'd like to know more about the important cost savings that are built into all SPEER Brushes, write today for your free copy of the booklet, BRUSHES BY SPEER!

SPEER Carbon Co
St. Marys, Pa.

A NEW FIBER GLASS INSULATION

developed specifically to meet the requirements of the TRANSPORTATION INDUSTRY

Transulite

Transulite is a lightweight, resilient blanket made of extremely fine glass fibers bonded together with a thermosetting resin.

It's UNIQUE because a specially developed binder minimizes moisture pick-up, even under severe operating conditions.

Because TRANSULITE is especially designed for the transportation industry it offers:

Superior Thermal Performance — one of the most efficient on a heat-resistance-to-weight ratio.

Superior Resistance to Moisture — when tested for 14 days in a humidity cabinet—such as used in the railroad industry for refrigerated cars — total moisture pick-up by absorption and adsorption combined was below the maximum permitted by the specifications.

Superior Resistance to Vibration—the most troublesome over-the-road operating conditions present no hazard. TRANSULITE holds its position . . . resists sagging or settling when properly installed.

Superior Durability—protects your longterm investment because the inorganic glass fibers will not burn, rot or sustain rodents and vermin.

TRANSULITE'S extreme light weight adds very little to overall unit weight . . . permits increased payloads . . . makes it easier to install! TRANSULITE is pleasant to handle . . . rolls are compressed to require less storage space.

Available in thicknesses and densities to meet specific requirements. Widths up to 120".

Find out how TRANSULITE, as well as Super·Fine, Microlite and Microtex, other products of L·O·F Glass Fibers Company, answer insulation problems for passenger cars, box cars, tank cars and cabooses.

Write: *L·O·F Glass Fibers Company, Dept. 56-108, 1810 Madison Avenue, Toledo 1, Ohio.*

L·O·F GLASS FIBERS COMPANY

L·O·F GLASS FIBERS

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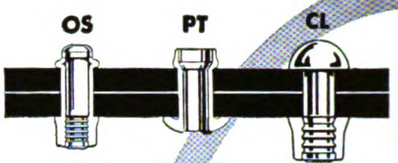
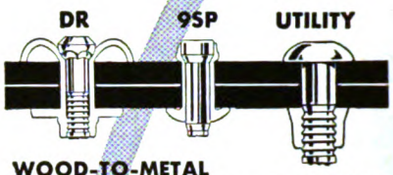


BETTER



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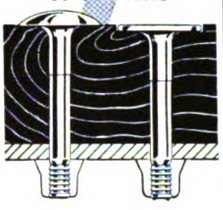

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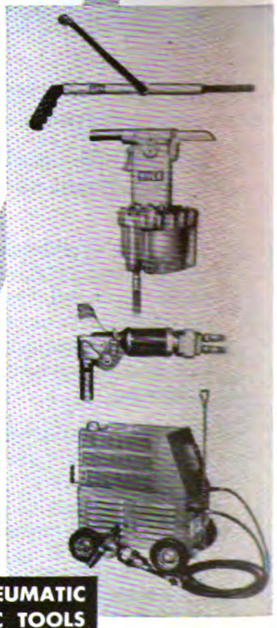

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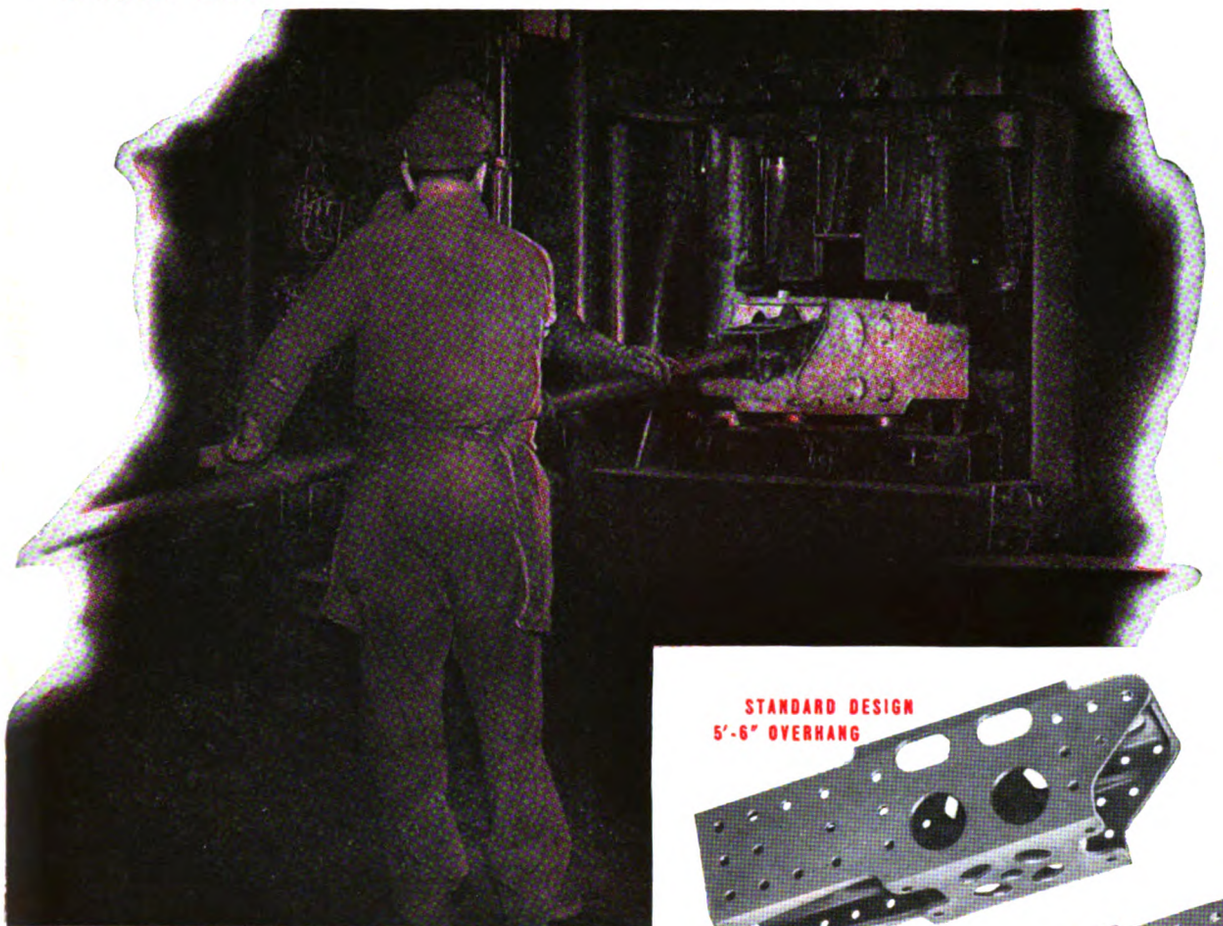
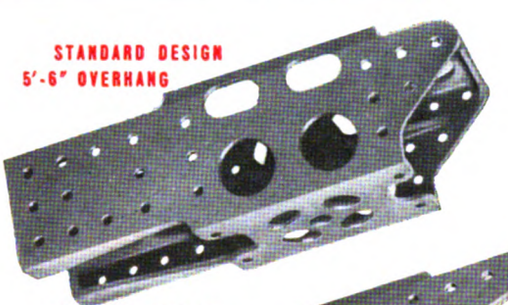
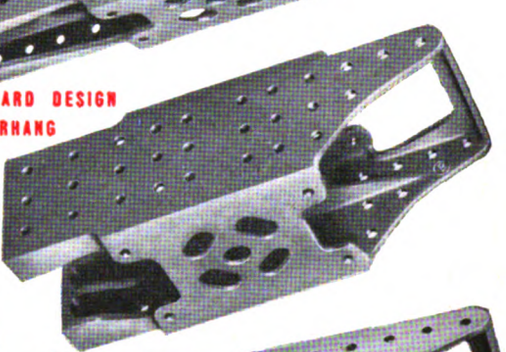


STANDARD DESIGN
5'-6" OVERHANG



STANDARD DESIGN
5'-0" OVERHANG



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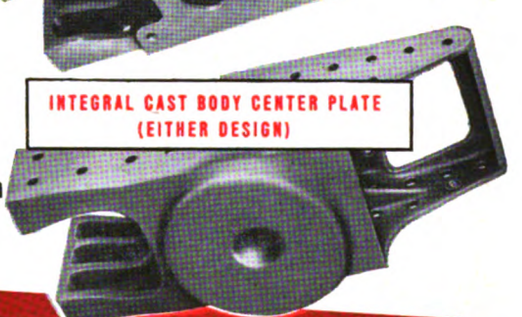

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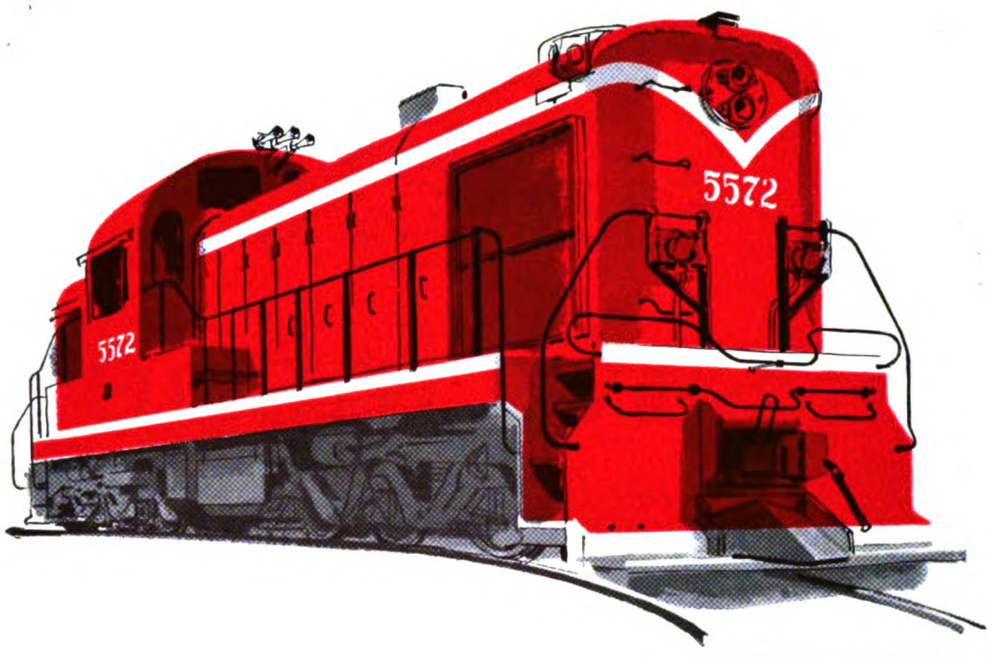

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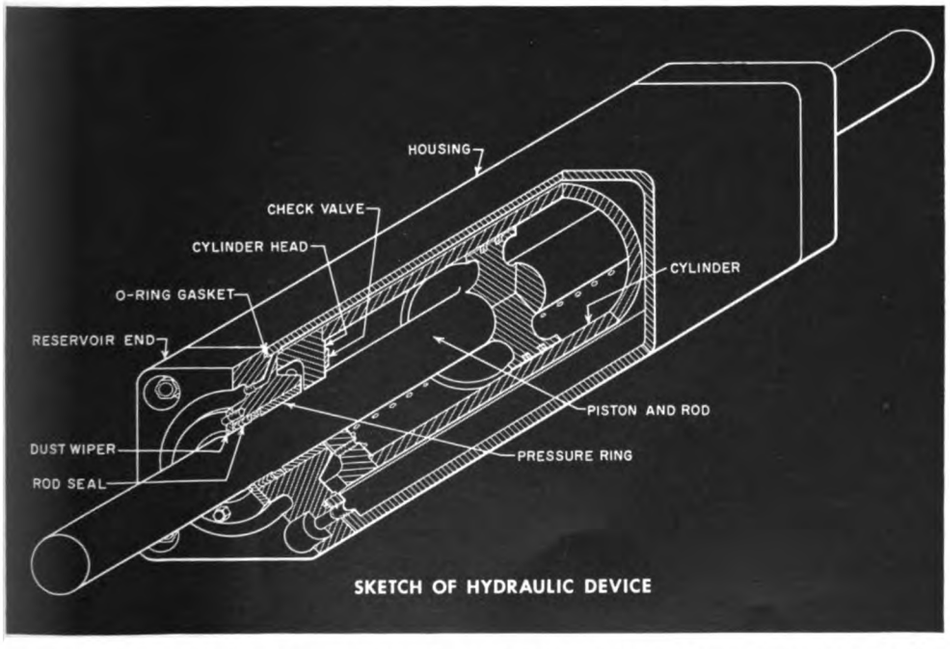
RAILROAD PRODUCTS

Hydraulic shock control arrangement is combined with DF loading equipment in these new box cars.

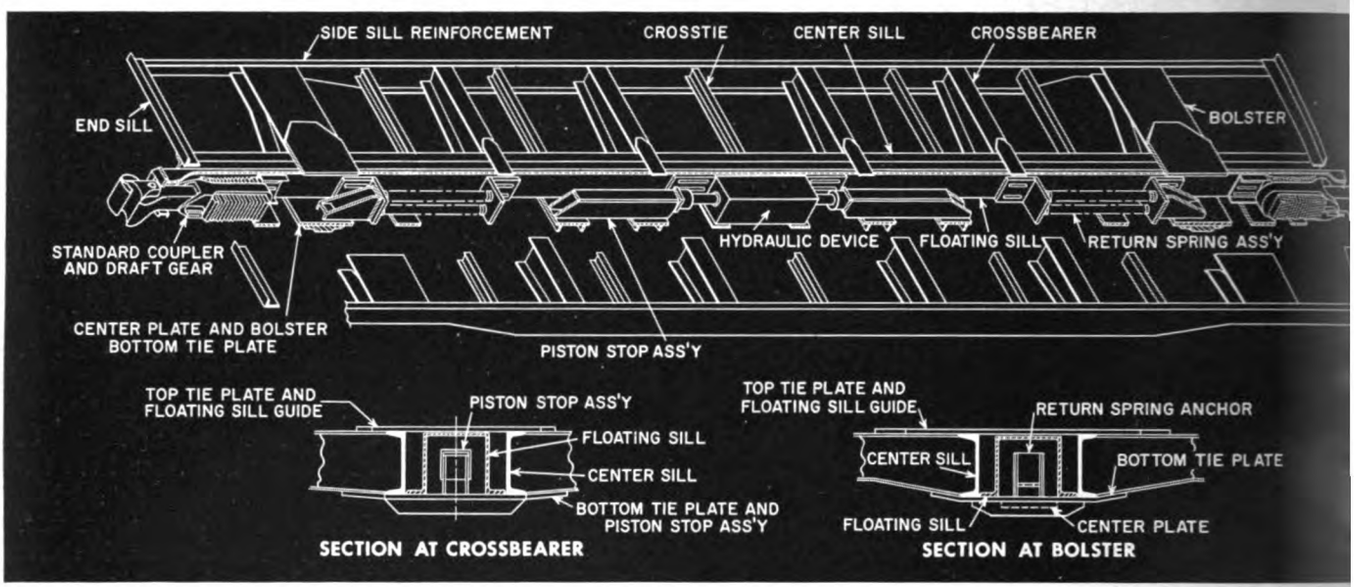
Santa Fe Builds 100 Shock Control Cars



Hydraulic cylinder mounted at center of the car has graduated orifices which control part of oil flow between two sides of double-acting piston.

BY THE END of September, the Atchison, Topeka & Santa Fe had 100 new "shock control" cars in operation to provide better protection to lading and reduce damage claims. Like the SP Hydracushion car, each new Santa Fe car has a floating sill and return springs. The AT&SF uses a hydraulic piston and cylinder instead of sliding and fixed brake plates, actuator and hydraulic metering pin assembly, (RL&C, May 1957, p. 53).

Designed and being built by the Santa Fe at the Topeka shops, the cars are a modified conventional 50-ft 6-in. DF box car with a floating underframe having 10-in. travel in either direction. The travel is retarded by a double-acting piston and cylinder contained in a housing located horizontally in the middle of the car between the center sills. Impact energy is absorbed in both buff and draft. Although designed to absorb high impact energy, there is no inherent recoil in this device. Santa Fe spokes-



Floating center sill fits between fixed center sills and is restored to normal position by return springs at bolsters.

men say its use with conventional high capacity draft gears protects fragile lading at impact speeds up to approximately 12 mph.

How Hydraulic Piston Works

The space between the outer cylinder wall and housing is filled with hydraulic fluid to within 2 or 3 per cent of capacity. Orifices of predetermined diameter and location are spaced at the bottom of the cylinder to permit oil to flow out of the cylinder. When the double-acting piston is displaced from its center position to the right, the oil on that side of piston is compressed and is forced out through the orifices. This movement of oil opens the check valve in the left cylinder head wall and allows oil to enter on that side of piston. Some oil also enters through orifices on that side. As the orifices are closed by the piston movement, the pressure rises but does not go up very fast because of the oil being forced out the remaining orifices. The pressure curve builds up in a fraction of a second at the beginning of the stroke, then levels off. The shock of impact is eased in this manner.

Floating Underframe

The floating sill runs the full length of the car. At each end, standard couplers and draft gears are applied. One end of the springs in the return spring assemblies (two per car) seats against an anchor casting welded to the bottom tie plate at the bolster. The other end seats against an L-shaped casting welded to the side of the movable sill. The springs are under compression when assembled. The piston and cylinder housing is welded to supports across the bottom of the fixed center sill and is independent of the floating sill. The piston stop assemblies (two per car) are welded to carrier support plates which in t welded to the floating sill. A mov of the floating sill to the right presses the return springs on that After movement of the piston stop work is done absorbing the shock springs gradually return the piston position at the center of the cyl eliminating recoil.

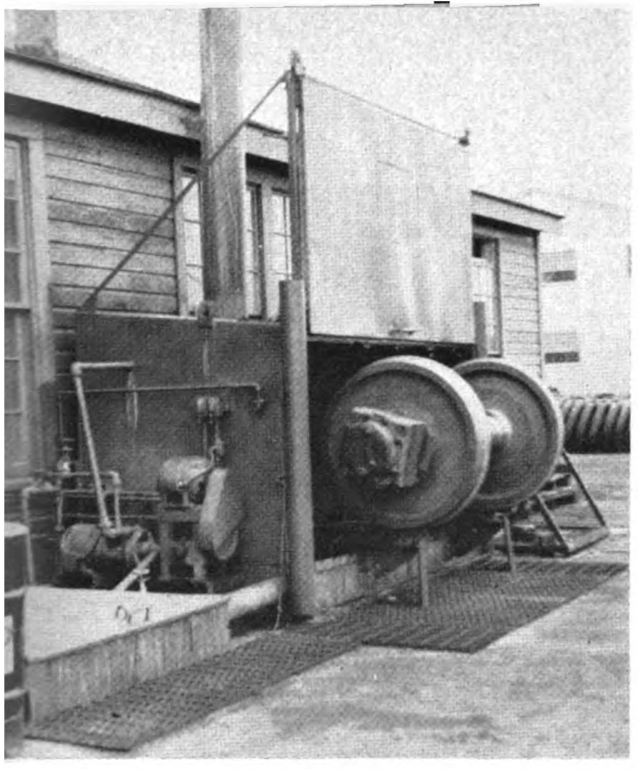
Equipment on these cars in roller-bearing, ride-control trucks long travel springs. The 6 x 1 nals compensate for the adjust weight of the cushioning device and vide a 60 ton capacity for the ca stead of the conventional 50-ton ca ity generally specified for a car in service. Standard DF loading equipm consists of 9 belt rails, 50 cross s bers—10 each of the 24-in. and deck bars—and 8 doorway mech The clear door opening is 8 ft 9 10$\frac{5}{16}$-in. The cars are painted b red with black and white stenciling.

Standardized Hopper Cars Have Been Completed

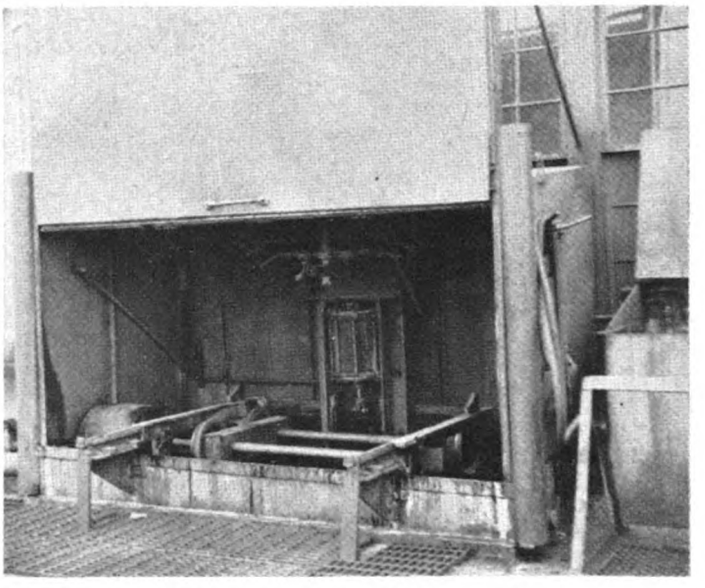
Stenciled, but not painted to simplify strain gage applications, the N&W car weighs 55,000 lb and is 40 ft 11½ in. over the strikers.

Each of three cooperating roads ticipating in a standardized hoppe design announced last month, has pleted a sample car (RL&C, Septe 1958, p 18). Chesapeake & Ohio, folk & Western, and Pennsylvania R delivered their newest hoppers to Technical Center of National Malle & Steel Castings at Cleveland f series of laboratory impact tests.

The design which represents bined efforts of the three roads, will finalized after laboratory and road t and offered to all roads and car build as a standard. Standard steel plates and shapes are used in the construc

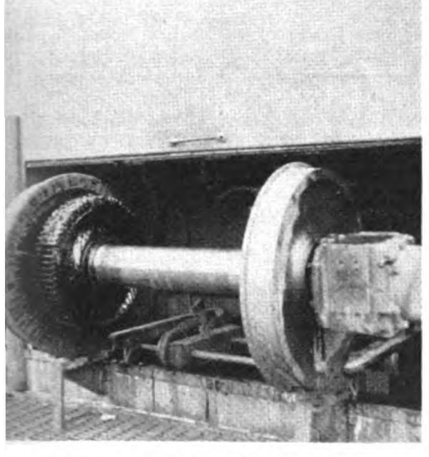


ning machine is located outside wheel shop.

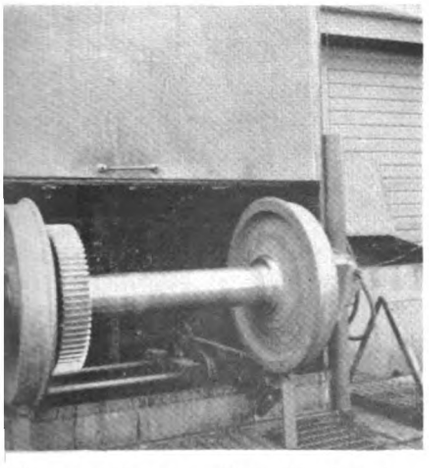


Rotating equipment and nozzles are in cabinet.

ow SP&S Cleans Diesel Wheels . . . .



ring cabinet is set of dirty wheels.



eels, axle and gear are thoroughly cleaned.

A DIESEL WHEEL-WASHING machine, installed just outside the wheel shop of the Spokane, Portland & Seattle at Vancouver, Wash., about a year ago, has effected appreciable savings in both the time and cost of cleaning diesel locomotive wheels. The machine is practically automatic in operation, once a pair of mounted wheels is placed in it. Even the dirtiest wheels, with heavily encrusted dirt and grease on the plates, hubs and driving gear, are thoroughly cleaned in 30 min or less. This can be compared with the former practice of manual cleaning which took two men half a day with a solution spray nozzle, hand scraping, and wiping. As a matter of fact, the wheels were never gotten entirely clean by this method and the messy wheel tracks and surrounding grounds always constituted quite an eyesore and safety hazard.

All parts of the new SP&S wheel washer were made of salvage materials. The housing, about 9 ft wide by 6 ft high by 5 ft deep is made of 16-gauge steel, applied over a 1-in. angle-iron frame. A 12-in. vent pipe, extending upward from the sheet metal hood, easily clears the housing of steam and fumes when the front door is open. This vertical sliding front door is counterbalanced by two ⅛-in. steel cables connected over 5-in. pulleys to suitable weights which move up and down in 5½-in. pipe guards on either side of the door. The heavy door can be easily raised or lowered by hand whenever necessary.

Inside the housing, the heavy steel base of the machine supports two pairs of 10-in. friction drive wheels spaced on 20-in. centers, mounted on roller bearing shafts and arranged to support and rotate the diesel wheels on their flanges. The drive wheels themselves are flanged to hold the diesel wheels in place lengthwise while being revolved at 4 to 5 rpm. The front shaft is power driven and turns at 16 to 20 rpm with 1½ to 1 gear reduction from a 3-hp. electric motor just outside and at the left of the housing. One precaution found necessary, by experience, is to cover all plain or roller bearings with metal guards. Otherwise, the strong solution spray used to clean diesel wheels washes out the grease lubricant quickly and causes bearing failures.

Another heavy angle iron frame which supports the diesel wheels on their treads, except while being rotated, is hinged to the machine base at the front and pin-connected to a 10-in. by 12-in. air cylinder with pressure head and piston at the back. Operation of this piston, under valve control from the front of the machine, raises the wheel-supporting frame 4 to 5 in. at the rear and allows the wheels to roll out easily onto two 18-in. outside rail extensions. Diesel wheels are loaded and unloaded by lift truck from these rail extensions which have sliding sections to fill the gaps required for complete closing of the large front door during operation of the machine.

(*Continued on page 54*)

Railroads Are Developing Variety

'Super Jumbo' PS-2 Covered Hoppers on the Burlington

THE BURLINGTON has just received 100 "super jumbo" cover hopper cars from the Butler, Pa., plant of Pullman-Standard. The cars have 3,219 cu ft capacity and were designed and built to provide increased capacity and new economies in the shipment of bulk commodities. This is the largest standardized PS-2 ever built and compares with the "jumbo" model which has 2,893 cu ft capacity and the standard car with 2,003 cu ft. Although the super jumbo car is higher and wider than the others, the overall length of 46 ft over end sills is maintained. Locations of loading hatches and unloading gates are unchanged so cars can be used with existing facilities.

Some of the cars are specially designed for handling specific commodities and are fitted with pneumatic outlets in addition to the regular outlet gates to speed unloading. When used in malt service, the cars can carry the malster's standard unit sale of 3,000 bu. Other products that will be carried include soy bean meal, brewers grits, dehydrated alfalfa pellets and bulk animal feed.

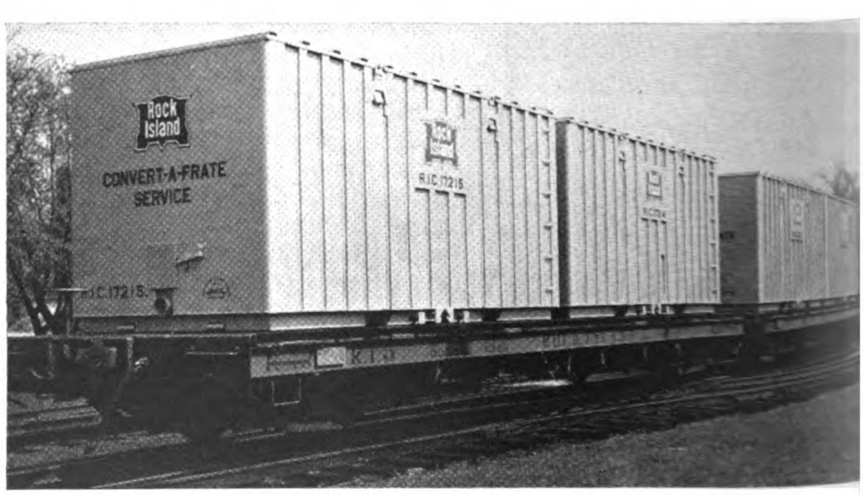
The new cars have all the features of the standard P-S cars, including all-welded joints without overlapping sheets which keep ladings free of contamination. The 50-deg slopes, the fast unloading discharge gates, and the weather-tight circular loading hatches are al to loading and unloading operation newly designed, flatter roof provi safer platform for workmen. The are equipped with roller bearings.

Partial List of Suppliers

Air brakes	Westinghouse Air Brake	Draft gears (Mark 40)	Cardwell-Westingh
Unit brake beams	Buffalo Brake Beam	Couplers	Symington-Wayne
Brake shoes	American Brake Shoe	Coupler yokes	National Malleable Steel Castings
Hand brakes	Ajax Consolidated	Uncoupling devices	Standard Railway E ment
Truck bolsters and side frames	American Steel Foundries	Running boards	United States Gyp
Truck springs	Union Spring & Mfg.	Discharge gates	Pullman-Standard
Axles (6x11) and wheels (1-W)	Bethlehem Steel United States Steel	Pneumatic outlets	Enterprise Railway ment
Roller bearings	Timken Roller Bearing	Vinyl paint	Pittsburgh Plate G

Containers on Rock Island and C&EI

AMERICAN CAR & FOUNDRY Division of ACF Industries, Inc., has built 48 boxes—30 for the Rock Island and 18 for the C&EI—to handle malt and brewers' corn grits for a St. Louis brewery. These 8- by 8- by 17-ft steel portable units have two top-loading hatches and a single unloading port at one end equipped with a hand lever closing device. They will be loaded while on the flat car, transferred to a flat-bed truck trailer at the team rack destination, and driven to the brewery. Unloading is done by tilting the box at a 45-deg angle with a telescopic hydraulic lift on the truck. Contents then flow by gravity and some air pressure to storage bin.



Four-wheel flat cars of Rock Island are now handling bulk malt containers. The boxes are moved o bed trailers at destination.

An additional 20 Convert-a-Frate boxes have been modified by the RI. The RI four-wheel flat cars, tow boxes per car, are used between the Twin Cities, Chicago and St. Louis. The C&EI has equipped six 58-ft flats to handle boxes each from Danville to St. L Both roads hope for additional bus because the boxes can be adapted to dle any granular, free-flowing mat

ethods for Handling Grain in Bulk

nverted
ered Hoppers
Southern Pacific

ALT SHIPPERS have long wanted to y the advantages of bulk rail trans- ation to their product. Equipment ie single-wall type would be at once n, odor- and vermin-free, and ca- le of fast, efficient loading and ading by pneumatic or other means. ly this year, the Southern Pacific signed and rebuilt a conventional e-compartment covered hopper car this purpose at its shop in Los geles. Satisfactory service tests led to order for eight additional cars of a er size and three cars adapted for t loading without enlargement. The son for the two sizes is that the in- try has found considerable variation grades of malt—some of which re- re cars of greater capacity than ers.

Three primary changes made in en- ging the original Class H70-14 cov- d hopper car design to adapt it for special loading included: (1) rais- the roof about 12 in. to give a total acity of 3,000 bushels of grain, the t generally preferred by breweries;) lining the entire interior of the car h a special light blue plastic (Archer- niels-Midland 410) to assure maxi- m protection to the lading; and (3) plication of pneumatic outlets and -control inlets just above each hopper or to permit unloading by suction se rather than gravity. This operation facilitated and, in fact, made possible a hopper bridge conduit shaped of -in. steel, welded longitudinally across ch hopper just over the hopper door d having lower edges which clear the or by 5/8 in.

This construction permits gradual w of the malt grain under the conduit d out through the outlet valve through suction hose. On the side of each pper opposite the outlet valve is a anually-controlled air inlet valve set give the desired rate of grain flow rough the outlet valve and suction se.

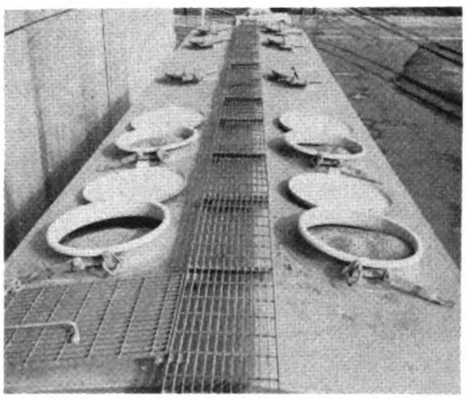
The original 70-ton covered hopper r, with a light weight of 61,500 lb d capacity of 2,893 cu ft, is enlarged have a light weight of 65,100 lb, load limit of 144,900 lb and capacity of 3,307 cu ft by raising the roof 12¾-in. The rebuilds are given a new classification, H70-14A. In making this conversion, each car is brought into the Los Angeles steel shop and the roof cut off where it was originally welded to the bulb angles. An electric-arc cutting torch with ¼-in. carbon tip is used. The side sheets, side posts, corner posts and compartment partitions are cut off and an I-beam lifting device applied to the roof which is moved to the shop and placed on wooden horses at a convenient working level.

It is here that 12¾-in. splices or extensions to the side sheets and posts are welded to the roof. The side sheet splices consist of shop-pressed 12¾-in. channel sections welded to the roof and designed to rest on top of the car body bulb angles to which they are subsequently welded. Side and end post extensions are welded in place in the channel sections before reapplication of the roof to the car body.

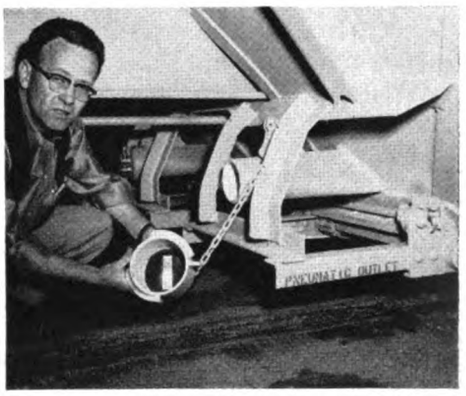
Work on the car body itself includes applying 12¾-in. extensions to the partitions, installing new end posts and ladder stiles, relocating the brake step, and lengthening the hand brake rod and retainer valve pipe. Hopper bridge conduits are welded in place inside the hoppers and suction outlet valves and inlet air valves installed. The car is then moved to the sand shed where the interior is thoroughly cleaned by sandblasting, preparatory to spraying with the 410 plastic which assures utmost cleanliness in handling the malt. This plastic not only covers all inside surfaces and crevices, but is applied at all points of possible contact with the grain, including the undersides of the hatch covers.

After exterior painting, stenciling and reweighing, the car is ready for its new service.

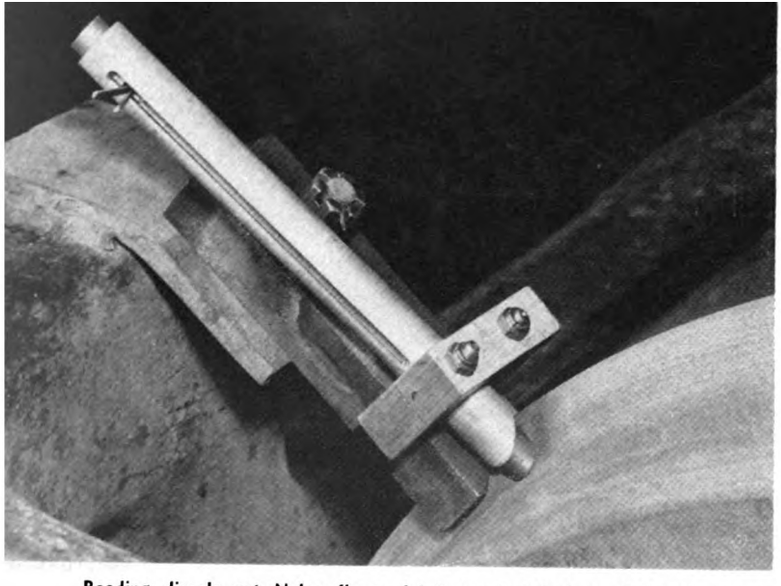
Greater capacity was provided in this standard covered hopper by raising roof. Unloading was simplified with new discharge arrangement.



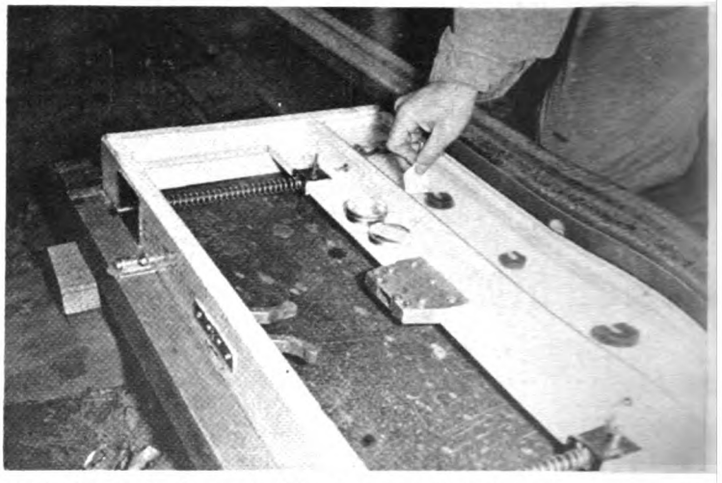
Plastic lining of interior included bottoms of circular hatch covers on this PS-2.



Outlet for pneumatic unloading was applied above conventional covered hopper discharge gate.



Reading diesels got Nalco flange lubricator installations similar to this on wheels at 1, 2, 7 and 8 positions. These "moly" sticks averaged over 2,000 miles of service before replacement was necessary. Reading tests showed good return on flange lubricator investment.



Catch box 32-in. long and 3-in. deep was used for collecting samples. Bottom tray collected metal abraded by locomotive and top tray was then moved into position to collect metal worn by cars. Alnico magnets under plastic trays held all metal particles produced.

Reading's Flange Lubrication Cuts Rail Wear

DIESELIZATION, with greater tonnage, higher axle loads and higher wheel torque, has created a tendency to accelerate rail and flange wear on curves and reduce the life of switch points and frogs. Flange oilers and rail lubricators are accepted methods for reducing this curve wear. Since the advent of rail adhesion studies on the Reading (RL&C, Oct. 1954, p. 86; Jan. 1956, p. 59; Feb. 1957, p. 65), the track condition has been watched constantly.

The Reading rail adhesion study was centered on a grade 35 miles long with 150 major curves and 19 rail lubricators which were located to protect the most severe curves. However, curve rail wear continued to be excessive and observors concluded that rail lubricators were not as effective as they might be.

The development of a rail conditioning compound did not improve the situation. The compound, when sprayed on the rail, covered the heads and sides of the rail. The compound delubricates oil or grease contamination on the rail. From the standpoint of rail adhesion, results were very favorable; but rail wear was accelerated. To obtain information on the amount of curve wear produced by locomotives and cars, tests were conducted on an 11-deg 16-min curve known as Raricks Curve.

The goal of these tests has been to evaluate the amount of rail wear with no lubrication, with rail lubricators using a petroleum-base grease, and with flange lubricators using a dry lubricant. Prior to the tests, it was concluded that some lubricant was almost mandatory but that the material should not impair rail adhesion. It appeared that a flange lubricator would be the most practical method for applying a dry lubricant to the flange of the wheel, and that molybdenum disulfide might be the lubricant.

Molybdenum disulfide is capable of withstanding high pressures and temperatures, has a high adhesiveness and cohesiveness, and forms a coating over the metal it is protecting from wear. Metal-to-metal contact is eliminated, and the coating has a very low coefficient of friction. "Moly" sticks made by National Aluminate Company are used.

Test curves on the Catawissa grade showed no shelling and flaking. Since the advent of flange lubrication with the dry, non-propagating lubricant, there was less abrading and curve-wear than with petroleum-base rail lubrication. With improved adhesion, burned rail from wheel slip should be greatly reduced.

Weather conditions and road-bed maintenance add to the many variables

(*Continued on page 56*)

Average Rail Wear—Grams of Metal Collected in Two 30-in. Trays

	Complete Train Cars and Locomotive	Complete Locomotive	Per Locomotive Unit	Cars	Per Car	Per 1,000 Trailing Tons
11-deg 16-min curve, 0.54 per cent grade						
Test series 1—July to Sept. 1954						
24 trains						
Rail lubricator only (one end of curve) ...	0.19837	0.09425	0.02513	0.10412	0.00083	0.01529
No rail or flange lubrication	0.24800	0.07687	0.02562	0.17112	0.00162	0.02575
Flange lubrication only	0.19350	0.04612	0.01537	0.14737	0.00150	0.02218
Test series 2—Nov. and Dec. 1955						
21 trains						
Rail lubricators only (both ends of curve)..	0.78520	0.18420	0.06140	0.60100	0.00631	0.09110
No rail or flange lubrication	0.96070	0.17760	0.06124	0.78310	0.00847	0.12753
Test series 3A—Jan. and Feb. 1957						
46 trains—temperature range 12 to 40 F						
New rail						
Rail lubricators only (both ends of curve)..	0.43621	0.11852	0.03731	0.31768	0.00296	0.04351
No rail or flange lubrication	0.39495	0.10760	0.03294	0.28735	0.00260	0.03647
Flange lubricators only	0.28878	0.05543	0.01687	0.23335	0.00199	0.03257
Test series 4—Feb. and March 1958						
9 trains—temperature range 31 to 40 deg F						
Flange lubricators only	0.17065	0.03783	0.01174	0.13283	0.00120	0.01889
9-deg 3-min curve, 0.78 per cent grade						
Test series 3B—Jan. and Feb. 1957						
36 trains—temperature range 13 to 38 deg F						
No rail or flange lubrication	0.72926	0.19902	0.06143	0.53054	0.00480	0.06805
Flange lubricators only	0.59607	0.14840	0.04535	0.44766	0.00389	0.05702

Coordinated Mechanical Meetings . . .

ew Maintenance Methods Are Emphasized

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NEW TECHNIQUES which must cut the costs of maintaining locomotives and cars without impairing their ability to move traffic were discussed by the four Coordinated Mechanical Associations meeting in Chicago last month. The Air Brake Association the Car Department Officers Association, the Locomotive Maintenance Officers Association, and the Railway Fuel and Operating Officers Association participated in the three days of meetings.

Approximately 1,500 railroaders took part in the sessions. This figure, virtually the same as the total for any of the three previous years, emphasized the importance of all these organizations in aiding railroad men to control costs and improve their operations. About 700 supply representatives, and 500 ladies and guests were also registered at the 1958 meetings. This was the fiftieth such session held by the Air Brake Association.

Locomotive Problems

T. T. Blickle, general manager—mechanical department, Santa Fe, summarized the problems confronting supervisors responsible for today's diesel locomotives. "The majority of the problems that we encountered while going through the dieselization process are quite different than the major problems we are facing today," he said. "There have been tremendous increases in labor and materials costs and every indication is that they will go higher . . . As locomotives get older it is quite apparent that they will require additional work to keep them in proper condition."

"We must maintain our motive power in suitable condition to protect the service," Mr. Blickle went on. "It is going to be necessary to find additional ways of saving manhours and materials. We must take a new look at maintenance schedules to determine where we are overmaintaining and where lack of maintenance may be causing increased expense. We must also take a new look at our shop practices to determine where further efficiency can be obtained. We must learn to work with smaller inventories.

"As a result of complete dieselization and fluctuations in business, in many instances there are excesses of diesel power which means that it is more difficult to maintain good utilization." This necessitates storing locomotives with consequent expense and problems.

"Obsolesence is catching up with quite a few diesel locomotives and has now reached a stage where it has become necessary to give consideration to the modernization of existing equipment or the purchase of replacements; and also to what should be done about providing a fleet of stand-by locomotives to take care of peak movements.

"The new ICC rules will be more restrictive than those in the past," Mr. Blickle continued, "and will also cause an additional financial burden—both from the standpoint of design changes and from increased inspection. It is important that all employees who have to do with locomotive maintenance become fully familiar with these new rules and their proper interpretation and application."

"Later Than You Think"

A shipper's views on cars and car supply were given to the Car Department Officers by L. L. Adams, assistant to vice president—traffic, U. S. Steel. He quoted a recent statement by PRR vice president D. C. Bevan, who predicted that an appreciable upturn in business will bring about the worst car shortage in history due to the virtual elimination of car repair programs and inadequate capital for the purchase of new equipment. Discussing the current and future car requirements of the steel industry, Mr. Adams said, "Please get your cars repaired, upgraded, and ready to roll! It is later than you think."

"If and when car shortages return," Mr. Adams continued," the familiar unfortunate pattern of the past may be expected. Initially 65-ft gondolas will become scarce; next wood-floor gondolas; then box cars. Soon thereafter, a shortage of practically all types of cars will be experienced.

"It is hoped that progress can be made toward programming car construction so as to avoid the historical peaks-and-valleys situation that has resulted in cars being ordered only when demand for them is already upon us, with the deliveries coming after peaks of demand have passed. Relatively few freight cars are being repaired or upgraded . . . Again it is feared that railroads will be too late in getting repair facilities going and too late in ordering repair material.

"Currently we are experiencing dif-

ficulty in obtaining adequate supplies of covered gondolas, other than coil cars, which suggests this type of car should be given prominence in railroad car construction programs . . . Standardization of freight car design has obvious economic advantages. Care should be exercised to avoid standards that fail to take into consideration the varying needs of commerce for cars of different sizes, clearances, and load-carrying equipment.

"The steel industry has recommended that 50 per cent of all new gondolas be wood floored. This is an area where by furnishing the shipper the right car, the railroads can be more competitive with other forms of transportation . . . We seem to be quite unable to get railroads to understand that we need to have drop ends (of drop-end gondolas) in place and operative; otherwise we would ask for fixed-end cars.

"For the longer range . . . the practicability of 75- or 80- ft gondolas should be studied. The 90-ton truck should be put under more gondola and hopper cars. There are many new design features for box cars available that offer much of value—wider door openings, interior fittings, flat cushion-type bulkheads in ends, to name a few . . . All cars should be on effectively snubbed trucks and should have built-in devices to absorb impact. These things are fundamental if rail freight is to go through on a competitive basis . . . To make real advances in solving any of these problems, we believe something must be done to make per diem charges more realistic. Modern data processing equipment could make this possible."

L.M.O.A.

Diesel Parts Cleaning

One of the large eastern railroads has placed the formulation of policy, with respect to product, usage and purchase under the jurisdication of trained personnel of the technical research department. The program that developed and the controls that resulted have accounted for sizeable savings.

The policy in effect on this railroad results in placing cleaners in specific groups or classes with numerical designation. Cleaners are not held to rigid specification, but are required to meet a standard performance specification. Cleaning materials tested for alkaline are first checked for chemical composition and if within the average contents of the accepted materials of the same class, the material is given a performance trial under actual usage conditions. If the cleaning material meets all requirements, it is then placed in the proper category and listed as an accepted product. This results in from four to five different materials being carried in any one classification, each suitable for performing the same cleaning work. Using forces order by class number rather than product name. The purchasing agent will obtain the material covered by the classification from either the supplier nearest to the using point or the company under contract.

At least once each year the consumption of cleaning materials for the previous year is reviewed. If a material through field checks does not maintain its performance or if price has been subjected to undue changes, a reevaluation is made of the material. When it is determined how much cleaning material can be purchased from each supplier, a contract is entered into which is guaranteed minimum per year, permits obtaining cleaning materials on car load prices regardless of the quantities in which the materials may be purchased.

To assure correct usage of cleaning materials it is the practice to classify materials by their basic types and to designate areas of application. Unless this, or similar control is exercised, the application of a specfic cleaning material can result in excessive waste. To illustrate the areas of correct usage of cleaning materials a chart showing suggested classification, their uses for basic cleaning materials is presented. This chart will serve as a basic guide for either large or small operations.

To reduce man-hours one of the large western railroads has extensively revised maintenance shop procedure to permit a centralization of the cleaning operations. The layout of the diesel parts cleaning by this railroad was integrated into engine stripping, inspection and reconditioning operations to obtain an over-all assembly line type of operation. Considerable planning has resulted in maintaining to an absolute minmum the labor necessary for diesel parts cleaning and parts handling. It has reduced the distance required for parts to be handled when performing various cleaning operations.

The removal of dirt, scale and lubricants from wheels is being given greater emphasis by inspectors. The 1957 report covered an automatic wheel cleaning device well suited to a production shop where wheel cleaning volume can justify costs of such equipment.

Agitation Required

To simply place pistons, valves, heads, engine frames in a boiling of cleaning material does not pro satisfactory degree of cleaning. The tion of mechanical action is neces cept for the loose, easily remova Agitating machines are finding mu application for the cleaning of components. An agitating type machine reduces the manpower re reduces the interval to obtain satis cleaning, and in addition, saves amount of cleaning materials requ do the job.

One manufacturer of agitating cleaning machines now offers a such machines to cover the small quirement to the largest requirem countered in cleaning diesel engi ponents. Machines are available from 30 gal of cleaning solution, 75-lb work load, to a machine handle a complete engine block frame, with a capacity of 18,800 cleaning solution and a work 13,500 lb.

For electrical rotating equipment obtain efficiencies over solvent spra dipping of such parts, the vapor de method of cleaning presents an opportunity for economy. In addi electrical equipment, many diesel ponents can satisfactorily and econo ly be cleaned by this method. This to smaller parts that do not have burned, carbon deposits. One railroa installed a shop designed and fab vapor degreaser which will han work load of 14,000 lb per hour. A degreaser is utilized for cleaning trical rotating equipment and in fans, blowers, journal boxes, wheel axle sets, cylinder liners, rods and smaller diesel engine parts not suit burned and hardened carbon de

Certain diesel components, par the cylinder heads, liners, pistons valves present a special cleaning pr which require hand or motor driv brush removal of hard carbon de The cylinder head areas such as carbon around exhaust valve po also hard scale in the water conta are expensive to clean by the va method. To economically clean th deposits remaining after normal ho cleaning of loose soil, cylinder he economically cleaned by a suction blast machine described in the 1957

The same type cleaning applied diesel parts subject to hard carbon its prove the most economical me employ. The valve cleaning ma described in the 1957 report p completely cleaned valves at the one valve each 15 sec or 240 va hr. The type production mach scribed in the 1957 report can be in the high volume, centralize shop, but if economies are to be for smaller operations, this type must be obtained on a modified ba in justifiable cost limits.

In checking with the manufa

machine, one railroad determined a standard production model could be omically used for valve cleaning. This type cleaning machine produced an lutely clean valve at the average rate ne every three minutes or 20 pr hr. machine adapted to valve cleaning ations is a hydro-finish liquid blast ing cabinet consisting of a water- cabinet provided with hopper tank mixing, storing and re-collecting the ing solution, utilizing finely ground tz crystals. This solution, known as y, is ejected against the parts to be ed by air pressure. An operator di- the flow against the part to be ed. The resultant cleaning action is a ring effect which removes the hardest sits from metal without any harmful ts on the metal part itself.

ning Oil Cleaners

ie higher-horsepower-per-cylinder en- have placed a heavier burden on ube-oil system. The use of fuels hav- a slower burning rate (lower octane ber) has increased the contaminants ie lube oil. Data assembled by vari- members of the Fuel and Lube Oil mittee indicates that the Alco 244 ie oil cooler can hold from 60 to of sludge, while an EMD oil cooler hold as much as 45 lb of sludge. me railroads are using a machine in- orating a high-capacity pump for the ing solution and a tank with heat- coils. Probably the most satisfactory p to use is an EMD water pump, rically driven by a 5-hp, 750-rpm r. The pump should be connected to 0-gal tank by a standard flexible con- on, or a 2½-in. pipe and Dresser ling. A 25-ft, 2½-in. inside diameter with suitable fittings for a pressure to the oil cooler and another similar for a return to the cleaner tank are ed. Some railroads use a cleaner re- ng heat, so heater coils are provided ie tank. The tanks are also equipped an overflow pipe and a drain valve. complete assembly is mounted on ls so that the device is transportable. epending on the condition of the oil cooler, it may require from 3 to to clean the oil cooler. This includes time necessary to back-flush the oil r and is particularly advisable when ing the Alco type cooler. This is ssary in order to remove the deposits oth sides of the tubes in the cooler. EMD type coolers, back-flushing is practical because of the baffle on the arge side of the cooler.

fter the cleaning operation is com- d, the lube-oil cooler and related g should be blown with air and ed with lube oil or flushing oil to re- e any trace of the cleaning agent. ion should also be taken that the ing agent will not attack any of the ls in the lube-oil system being flushed. lube-oil cooler on a GP-7 locomo- was cleaned by using the above od. First, the core was removed, weighed and replaced. After a cleaning operation of 4 hr, the cooler core was again removed and found to be clean. The core had lost 12 lb of dirt or sludge. A similar operation on an Alco road-switch locomotive removed 20 lb of sludge.

Temperature readings taken on load test of GP-7 and GP-9 locomotives show cleaning of oil cooler reduces oil temperature from 30 to 50 deg.

Heat rejection in the lube-oil cooler should be about 15 deg F in an EMD F-7 or F-9 engine with a clean oil cooler. If the difference between oil temperature into and out of the cooler is less than 10 deg F, the oil cooler has sludge deposits. It is important from the standpoint of maintaining good oil condition to keep lube-oil temperatures within the 220-deg F range. The deterioration (oxidation) rate doubles with each 10 deg F rise above 220 deg F. In other words, the oil temperature should not exceed this figure for best lube-oil performance.

A Suggested Classification and Use Chart For Basic Cleaning Requirements - Diesel Locomotives

Classification	Material	Solution Strength	Authorized Uses
Hot Tank Cleaner Heavy Duty	Highly Alkaline Detergent Type Powdered Compound	4 to 8 Ounces Per Gallon of Water	1. Hot soak tank cleaning and degreasing of diesel locomotive engine parts made of iron or steel only. 2. Hot soak tank cleaning of large parts such as gear cases, etc. 3. Cleaning panel type air intake filters.
Hot Tank Cleaner Medium Duty	Inhibited Alkaline Detergent Type Powdered Compound	4 to 8 Ounces Per Gallon of Water	1. Hot tank cleaning of aluminum and other soft metal parts from diesel locomotive engines.
Cold Spray Cleaner Light to Medium Duty	Mild Alkaline or Mild Acid Detergent Type Powdered Compound	A. 5 ounces per gallon of water B. 4 ounces per gallon of water C. 3 ounces per gallon of water	1. Cleaning road diesel exteriors with Whiting washer solution strength B 2. Cleaning road or switch diesel exteriors by hand, solution strength A 3. Cleaning diesel trucks, solution strength A 4. Cleaning cab and engine room interiors, solution strength C
Cold Spray or Cold Vat Cleaner Medium to Heavy Duty	Oil and Grease Solvent and Emulsifier - Liquid Type	A. 1 part to 3 parts of water B. 1 part to 3 parts of diesel fuel C. 1 part to 5 parts of diesel fuel D. 1 part to 5 parts of water	1. Maintenance cleaning of trucks, underframes, and tanks under locomotive, solution strength A 2. Maintenance cleaning diesel engine top deck, air box, crankcase, and "A" frame, solution strength C 3. Maintenance cleaning of bull gears and wheels in vat, solution strength B 4. Maintenance cleaning diesel cabs and engine rooms, solution strength D
Steam Cleaners Light to Heavy Duty	I-High to Medium Alkaline Detergent Type Powdered Compound II-Light to Medium Alkaline Detergent Type Powdered Compound	4 ounces per gallon of water	1. Heavy duty maintenance steam cleaning of all types, use "I" in hypressure Jenny or similar equipment. 2. Light and medium duty steam cleaning with hypressure Jenny or equivalent equipment, use "II" varying solution strength from 2 to 4 ounces per gallon of water according to requirements.
Scale Removers	Inhibited Inorganic Liquid Acid or Organic Powdered Acid	Liquid Acid: A. 1 part to 4 parts of water Powdered Acid: A. As directed by manufacturer	1. Removing scale from interior of coils of steam generators. 2. Descaling diesel water radiators.
Electrical Parts Cleaner	Inhibited Organic Solvents	Use full strength as received. Do not Dilute	1. For general cleaning of locomotive electrical equipment, to include cabinets, generators, traction motors, and accessory equipment. Spray or wipe.
Vapor Degreasing	Trichlorethylene or Perchlorethylene	Use full strength as received. Do not Dilute	For vapor removal of oil, grease and foreign matter from selected diesel parts in special tank equipment, produced or purchased for this type of cleaning.

Extension of Diesel Maintenance Intervals

One possibility for reducing costs is to extend the intervals between maintenance operations.

Modernization of the Alco 244 engine on railroads represented by this committee has resulted in a considerable increase in time between power assembly overhauls. The use of serrated main bearing caps, hardened crankshafts and semi-grooveless bearings has eliminated the requirement of bearing inspections formerly made at six months or annually. This can be extended in the case of connecting rod bearings to the time of assembly removal. Inspection of the center main bearing formerly at 90-day intervals, six-month intervals and at the time of annual inspection, the committee believes, can also be extended to the assembly changeout period.

Where the Ni-Resist piston ring carriers are used, it is the New York Central's experience that in heavy freight service the overhauling of the cylinder assemblies can be extended to 30 months, provided unplated cylinder liners are used in combination with the chrome plated top ring. The ring should have at least .007 in. to .008 in. chrome thickness on the ring face. Very limited experience with chrome plated liners in 244 engines indicates that it will not be possible to extend cylinder assembly overhaul where cast iron rings

are used in combination with chrome plated liners as top ring wear in 24 months has caused ring gap to be as much as .209 in.

Side wear on piston rings where the Ni-Resist insert is used has proved to be within reasonable limits. However, we may find, in the future, that a thin flashing of chrome plating may be advantageous on the ring sides. Some roads have excellent results using Ni-Resist ring carriers with cast iron rings in chrome plated liners, reporting no excessive ring wear after two years use in passenger service. The pistons with Ni-Resist ring carriers in all cases reported are in such condition that they are re-installed for an additional two years service.

It has been found where properly overhauled and calibrated fuel injection pumps are used that it is no longer necessary to change out the pumps on a mileage or time basis. They will operate satisfactorily to the cylinder assembly changeout date. A portable fuel injection pump and nozzle tester has recently been developed that allows testing of the fuel injection pump and nozzle for leaks and the nozzle for proper popping without their removal from the engine.

Some roads have found it possible to operate traction motors in road service up to 500,000 miles without overhaul through the use of modern insulating materials and greases.

The committee feels that on switch units it will be satisfactory to eliminate from a time or mileage inspection such overhaul of the following items: traction motors, main generators, engine blowers, superchargers and auxiliary generators. If these items were overhauled only when defective, considerable saving could be realized. On switching power it has been found that considerable saving can be made by overhauling cylinder assemblies only when conditions indicate assemblies are badly worn or otherwise defective.

EMD Engines

EMD in their M.I. 1704 issued October 1957 extended lead readings on EMD diesel engines to 120,000 miles in freight service, 250,000 miles passenger or one year. Some roads represented on this committee takes lead readings on a three to six months' basis on road power until two years service has been received from the assemblies. The lead readings are taken monthly until power assemblies are renewed, to insure that no excessive wear exists in compression washer, wrist pin bushings or connecting rod bearings.

One railroad discontinued the cleaning of air boxes on EMD engines about 2½ years ago. They experienced a reduction in piston seizures and scored liners. Air boxes are not cleaned except at time of power assembly renewal. This item deserves further investigation as a small saving can be made at time of each monthly inspection if we find cleaning of air boxes is not necessary.

Most railroads change out cooling water and lube oil hose on an annual basis to prevent failures and possible personal injuries. It has been found that the use of Dresser couplings in place of hose has eliminated the necessity of any kind of inspection and materially reduces failures.

15-Day Inspections

It has been found that with proper monthly inspection and maintenance on road freight and road switch power that most of the items, formerly performed on a 15-day basis, can be eliminated and those that experience indicates are required can be accomplished in a very short time at fueling stations or turnaround points. The following items should be handled on a 15-day basis:

On Alco power, clean lube oil strainers, renew lube oil filters, change or clean and oil engine air intake filters.

On EMD power, change out lubricating oil filters, change or clean and oil engine air intake filters, check oil level in ... bearings and check lubricant in ... motor gear cases.

567-C Engine

It is generally accepted that th... the EMD 567-A or B power ass... limited, not so much to piston ... liner wear but to worn compre... thrust washers and wrist pin bush... sulting in high lead readings: or ... leaks.

In designing the 567-C eng... manufacturer has provided a ver... piston carrier, heavier and lon... compression washer and provided ... erably more bearing area in the pis... however, lubrication seems to ... provement. It therefore, appears ... committee that if the manufacture... improves the piston and liner ... so that life comparable with 56... engine can be obtained from ... liners and rings, cylinder assembly ... out could be extended six month... sibly one year longer than the old... engines. Water leaks should not ... tor in "C" engine cylinder assemb...

The manufacturer has improv... lower liner seal to eliminate pre... crankcase and reduce oil leaks ... main bearing and top deck.

Diesel Storage Presents New Problems

This subject is controversial. The method used depends largely on the facilities available. Because diesels have not been stored the length of time necessary to determine the best procedure several methods are reported.

One railroad uses this procedure: Drain engine and compressor lubricating oil and refill. Bring concentration of engine water cooling system inhibitor to three ounces per gallon. Run engine at idle for one-half hour. Shut fuel pump off and allow engine to run itself out of fuel. Open main battery switch.

Make notation on engine shut down tag that water has been drained and main battery switch has been opened for purpose of storage. Show date stored and post this tag near start button.

Drain all air lines and otherwise protect unit against freezing. Considering location of storage point, provide adequate protection against damage from deterioration due to snow, ice, water, and dust. If hand brake is located within cab or body, it is to be set when stored. Make notation of this at each corner of unit.

Protect unit from trespassers, pilferage, fire, runaway, and collision. Take gravity readings semi-monthly and if hydrometer reading is below 1200, apply trickle charger to bring reading above that minimum to prevent sulphating of batteries.

A second road advises: Remove storage batteries and store so that ... can be properly taken care of wh... of locomotive. Thoroughly drain ... from engine and cooling system, ... ter pumps and cab heaters and ... storage tanks.

Drain lube oil from engine. Pum... toyl compound through lubricating ... of engine. Remove oil from journal ... and completely fill box with Tecto... move unit so as to work the com... thoroughly into roller bearings and ... If stored outside, the exhaust stack ... be covered. Set hand brakes and ... wheels.

A third road reports that it is gen... known the diesel locomotive deter... very rapidly when not being used ... gested rotating locomotives progre... on a schedule where the batteries ... require external changing, etc. And ... during the off seasons it makes ... time for heavy repairs to be mad...

Where the rotating of locomotive... not be made steam should be con... to the engine cooling system to p... expansion and contraction of the e... from developing water leaks. The ... ies should be placed on charge to p... plates from sulphating. If these fa... are not available the engine shou... started every two or three days and ... for at least an hour or two.

With these practices in force, lo... tives could be stored for 30 days ... then exchanged with the same num... locomotives in service. If neither of ... suggestions are adaptable, the ba... should be removed and placed in ba...

where they can receive proper at-
on. The engine cooling lubrication
fuel systems should be drained and
ped full of Tectoyl compound as out-
. in manufacturers' general service
tin.

fourth road reports instructions gov-
ng the storage of diesel locomotives
porarily, not exceeding 30 days.
re steam is available, locomotive will
tored in house with no other precau-
other than connecting a heat ex-
ger during winter period. The cooling
r temperature can be maintained at
deg by use of steam at 60 lb pressure.
steam to be piped through the coil
cooling water in the jacket and this
ication to require one heat exchanger
one steam trap with steam line on
diesel engine stored.

ocomotives in such temporary storage
ouse will have the diesel engine started
week and allowed to operate two to
e hours to re-charge batteries and at
same time circulate fuel oil and lu-
ating oil. These locomotives will also
moved three wheel revolutions each
days to prevent roller bearing from
ing.

he same road reports instructions for temporary storage of diesel locomotives not exceeding 30 days where steam heat is not available. Under this they report laboratory is to make an analysis of lubricating oil to determine if it is in good condition and can remain in crankcase. If analysis shows oil to be detrimental it should be drained and refilled. Bring concentration of engine water cooling system inhibitor to three ounces per gallon. Run engine idle for one-half hour. Drain cooling water. Open main battery switch. Make notation on engine shut down tag that water has been drained and main battery switch has been opened for storage purposes and post this tag near start button. Show date stored. Drain all air lines and otherwise protect unit against freezing.

Take gravity readings semi-monthly and if hydrometer reading is below 1200 apply trickle charger to bring reading above that minimum to prevent sulphating of batteries. Each three weeks move engine back and forth three wheel revolutions to prevent etching of journals.

Under storage in excess of 30 days when units are not parked on steam inside of house this road suggests following manufacturers' bulletin on storage of locomotives.

.D.O.A.

chanical Reefer Fleet ntinues to Grow

A total of 3,511 mechanical refrigera- cars were in service on US and Cana- n railroads on June 17, 1958. The OA Committee on Maintenance and rvicing of these cars discussed some the difficulties associated with their eration and suggested a list of tools d supplies which would be necessary r servicing and maintenance.

"Extensive" troubles with batteries, bat- y charging equipment and electric rters have led the Committee to recom- end further work with hydraulic starters. vo of these devices are available—Hy- o-starter made by Aero Division of eneral Motors and Hydrotor made by merican Bosch Arma. Two Hydro- rters have been on test for some time and five others are soon to be applied. One operated almost 8,200 hr before repairs were needed. Most of the hydraulic starter defects have been the failures of hydraulic seal rings.

The Committee suggested that battery charging voltage regulators be relocated so the contacts are unaffected by impact. Pacific Fruit Express is now using nickel cadmium batteries to replace lead-acid batteries. Advantages claimed are need for less water, greater resistance to low temperatures, and better cold-weather starting characteristics. However, the Committee continued, "Due to increased cost of the nickel cadmium batteries, service beyond the 10-year guarantee will be needed to offset the cost." Alternators without brushes are now being applied to new PFE cars. This should solve some of the troubles with stuck brushes and consequent burning of the commutators and slip rings.

Tools for Servicing and Maintaining Mechanical Refrigerator Cars

ols for Trouble Shooting

-Refrigeration gage test manifold complete with gages and valve handles
-6-ft flexible refrigerant charging line
-3-ft flexible refrigerant charging lines
-Temperature meter with 15-ft Thermocouple
-Thermometers, 50- to 120-deg range
-Prestolite leak detector for Freon 12
-Copperhead
-Ammeter, 50 amp and 250 volts
-Frequency meter
-Oil charging pump
-Set of wrenches for valve stems including ratchet for use with sockets; valve stem sockets in following sizes—3/16-, 1/4-, 5/16-, 1/2- and 7/16-in. sizes, and 21/64 x 15/32-in. packing-nut socket.

Tools for Pre-Trip and Subsequent Inspections

1—Flarenut wrench 3/4 x 1-in.
1—Flarenut wrench 7/8 x 1/8-in.
1—Battery hydrometer
1—Anti-freeze hydrometer
1—Injector timing tool for Detroit diesels
1—Injector lifting tool for Detroit diesels
1—Valve lash gage
1—Slack tube Manometer
1—Vacuum Pump

Expendable Parts for Mechanical Reefers

Car owner and Equipment	Replaceable Element Mfgr. and part no.	Diam. in.	Lgth. in.
Primary Fuel Filter Cartridge			
MDT			
Detroit 2044A	DD 5192854	3	5
BRE-FGE-WFE			
Detroit 2044 and 2044A	CFC 10R6	2 1/2	6
SFRD			
Detroit 3044A	DD 5573264	2 1/2	8
Secondary Fuel Filter Cartridge			
MDT			
Detroit 2044A	DD 5573264	2 1/2	8
BRE-FGE-WFE			
Detroit 2043B	CFC 19X4-2V	2 3/4	4
Detroit 2044 and 2044A	CFC 19X8-2V	2 3/4	8
SFRD			
Detroit 3044A	DD 5192854	3	5 1/2
Lube Oil Filter Cartridge			
MDT			
Detroit 2044A	DD 5572425	4 1/2	8
BRE-FGE-WFE			
Detroit 2043B, 2044 and 2044A	AC P117	4 1/2	8
SFRD			
Detroit 3044A	DD 5572425	4 1/2	8
Dryer Cartridge			
MDT			
Frigidaire	Frig. 5911747	2 1/4	11
BRE-FGE-WFE			
Frigidaire All-purpose	Frig. 5911747*	2 1/4	11
SFRD			
Trane All-purpose	Trane DHY-803		

*1/2-in. flarenut connection
CFC—Commercial Filters Corp.; DD—Detroit Diesel; Frig.—Frigidaire

Refrigeration Control

After experimenting with various defrosting arrangements, the Committee reports that "it is fairly well accepted that the air-pressure differential switch is the best way to initiate defrosting," and that the best way to terminate the process is with a device which measures the temperature of the evaporator coil. The characteristics of such termination thermostats or thermal switches change with age. The Committee also warns that these devices should be located so that impact does not affect their contacts.

Warning that moisture cannot be tolerated in a refrigeration system, that Committee asked that increased attention be given to moisture indicators. Two of these devices are the Ansul Dri-Eye and the Sporlan Moisture Indicator. There have been some bad experiences with moisture indicators, but some of these troubles have been solved.

Another accessory which has been used with some installations is the quick-disconnect, self-sealing coupling. Where components are arranged for quick change-outs, this coupling has a place. On refrigerator cars, it has been used in the fuel lines. Some work has been done with it in the refrigerant line, but the device has tended to leak at the threaded joints.

Coordinated Mechanical Association Meetings

The Vapor Heating Corporation thermostat panel now includes an "Alls Wellite" pilot. On the newest PFE cars, it is mounted 16 in. below the running board on the car end and gives off a violet light visible 200 to 300 ft if the temperature is within plus or minus 5 deg of the thermostat setting. This should speed up train-yard inspections.

The Committee warned failures of pilot lights have frequently caused trouble, but this device is a fail-safe arrangement.

Hot Box Problems Are Not Solved

THE "DISAPPOINTING" hot box performance in 1957 as compared with 1956 was mentioned by the CDOA Committee on Car Lubrication in discussing the problems of freight car journal lubrication and performance. "It can be expected that the hot box situation will become increasingly more critical as a result of reduced maintenance and servicing forces," concluded the Committee. "It would seem that one of two decisions must be made. Either accelerate the rate that loose waste is eliminated, or increase servicing forces to obtain the maximum serviceability from cars lubricated with loose waste."

Looking ahead, the Committee forecasts the following developments:

- Better lubricating pads with greater durability, wicking, and oil retention.
- New developments in dust guards and oil seals.
- New designs of axle and journal stops.
- Changes in bearings and wedges to give better load distribution with some control over journal movement.
- Changes in journal oil and its application.
- Increased interest in rules dealing with inspection, maintenance and servicing of cars lubricated with lubricating devices, and in the maintenance of trucks.

Steps "beyond acceptance of lubricating pads involve considerable additional money outlay," warned the Committee. "Lubricator pads complete with developments considered necessary for an improved journal box assembly add up to a sum unlikely to be expended in the light of present economic conditions. The best compromise would require a wise investment in pads and improvements related to [illegible] formance of the pads."

Roller Bearings

The 40,000 sets of freight [illegible] bearings in service are giving [illegible] ance which is "very encouraging" [illegible] ing to the committee, and the [illegible] applications should grow. The [illegible] cited a series of features of these [illegible] worthy of note:

- All bearings are interchan[illegible] standard roller bearing axle[illegible] assemblies are interchange[illegible] variety of truck side frames.
- Bearings are assembled, [illegible] lubricated and packaged [illegible] damage or contamination.
- Some bearings are so des[illegible] no unauthorized personnel [illegible] access to the bearing and [illegible] sary work is sent to [illegible] special facilities for inspection, assembly and lubrication. [illegible] parts do merit this attention [illegible] ing to the Committee.

In servicing, these bearings [illegible] be lubricated with too much [illegible] Committee warned. Checks [illegible] temperature should be made [illegible] the adapter and not the bearing. The Committee called attention [illegible] fact that roller-bearing wheel [illegible] be stored on staggered wheel tra[illegible] done with standard wheel assem[illegible]

(Continued on page 3[illegible]

Car Officers Recommended These Interchange Rule Changes

Rule 3, Section t

Eliminate Paragraph 3-b because side frames of these types should not be used in interchange. Modify Paragraph 3-c for the same reason to read "Brake hanger brackets, repairs or renewals, may be performed as outlined under Section B of Rule 23."

Rule 4, Section f

Modified Paragraph 3 to eliminate reference to cars with lading tie-down anchors and make the figure read "2½ in. measured in any direction" on all cars to permit application of tie rods or cables on cars with strap anchors.

Rule 4, Section l

Interpretation 3 modified to eliminate material beginning "car owner . . ." and substitute "joint inspection should be made in the manner prescribed in Section k".

Rule 9

Modification of section on "Wheels and Axles, R and R" (bottom of page 44) to add "or flood damage". Modification of section on "Draft Gears" to require "When secondhand gears are applied, show date of manufacture and date reconditioned".

Rule 17, Section i

Modification of Paragraph 4 to require that if "new or secondhand nonapproved" gear is applied, charge should be confined to "scrap" value. Rule 101 does not indicate secondhand value.

Rule 17, Sections n and o

Modification of Paragraph 1 to require that "Built-in stabilizing devices, laterial motion devices, or provision for long spring travel must be maintained where standard to car", in accord with generally accepted practices and to maintain owner's standard. Similar change in Rule 88.

Rule 17, Section t

Modification of Interpretation A-3 to read "Defect card is required for labor only to correct such wrong repairs", because Rule 3 permits only certain types of retainer valves.

Rule 32

Paragraph 10-k modified to read "Center sills warped, sagged, buckled, or bent to any extent vertically or horizontally between body bolsters, where there is evidence of direct flame having been applied to facilitate unloading". Paragraph 12-b modified to read "for defect card to road responsible. Joint Inspection Certificate must indicate whether or not car can be restored to same condition by cleaning as existed prior to contamination. Few roads avail themselves of opportunity to inspect contaminated cars and they do not share in loss of per diem brought about by damage to cars. This would expedite repairs.

Rule 36

Modify Paragraph 1 by eliminating "Delivering Company Responsible" and brackets. Paragraph 13 modified by adding "for any violations of ICC regulations". Interpretation 6 would be changed to eliminate issuance of defect cards for removal of placards on cars other than those subject to ICC regulations. Similar change in Rule 107—Item 105.

Rule 60, Section k

Addition of new Note 1 reading [illegible] cleaning of Universal and D-22 type [illegible] equipment on freight cars shall be [illegible] by the time limits provided in Pass[illegible] Rule 7". Both types of valves are [illegible] freight service.

Rule 60, Section l

Eliminate Note 1, because these [illegible] no longer in service.

Rule 61, Section a

Paragraph 2 modified to eliminate req[illegible] that truck should be removed bec[illegible] is too much work to be done free [illegible] Addition of new paragraph 4 was [illegible] encourage in-date testing of cars w[illegible] pair tracks by permitting charge [illegible] and stenciling.

Rule 107

Recommended that labor charges [illegible] hours be resumed because supervis[illegible] these figures to measure produc[illegible] addition, frequent changes in hou[illegible] make it necessary to check each [illegible] date and charge applicable on that [illegible]

Rule 111

Recommended that Item 28 Note 1 b[illegible] fied to permit charge for both mate[illegible] labor. New section added reading [illegible] adjuster, automatic, cleaning, oiled [illegible] paired, including any necessary [illegible] except renewal of body or frame, [illegible] charge each". This is the same as pa[illegible] car Rule 21.

NATIONAL stopped this brush mix-up with one all-purpose brush grade!

C. F. EISELE

This railroad used a number of different brush grades of the same size on similar auxiliary motors of its freight units, says "National" Carbon Brush Man, Chuck Eisele.

Stocking the various grades was problem enough. Much worse was the danger of mix-ups — outfitting motors with the wrong brush grades.

By carefully analyzing work loads, Chuck Eisele was able to recommend *one "National" brush grade* to handle all auxiliary motors. The mix-up and stocking problems were solved completely.

Solving brush problems is a specialty of "National" Carbon Brush Men serving the nation's railroads. The men's training, backed by National Carbon *long term brush development*, make them your best consultants.

Call your National Carbon Brush Man or write to National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

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Experienced in Design and
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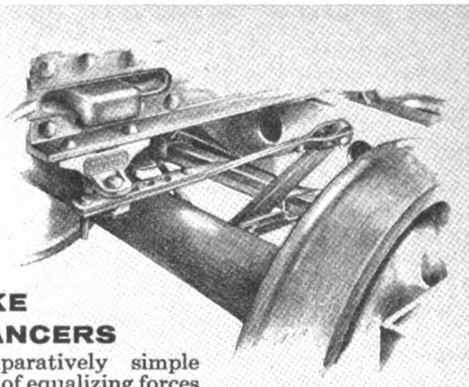
The nation's railroads are noted for many great tra
tion achievements . . . one of the most important h
efficient handling of the country's heavy bulk freig

Since 1912, The Wine Railway Appliance Company
signed and manufactured many of the important
hopper, gondola, flat and box cars that make this
function possible, as well as profitable, for the own
users of the cars. In the years ahead, Wine will c
through its experience, engineering know-how, and
facturing skills, to keep pace with the needs of the
industry.

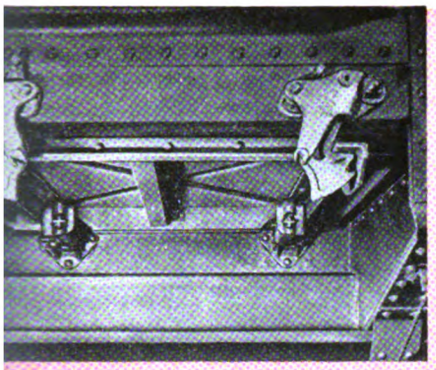


BRAKE BALANCERS

A comparatively simple method of equalizing forces and "balancing" the conventional brake arrangement by replacing the dead lever connection to the truck bolster with the Wine Balancer—connected to the car underframe. A bracket and connector at each end of the center sill flange, engaging the dead lever, balances the brake forces by returning them to the underframe of the car.

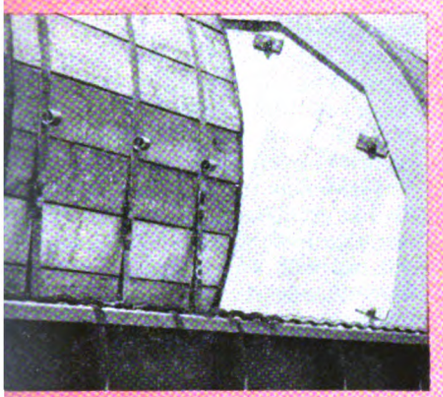
CORRELATED HOPPER UN

The one-piece, cast steel frame unitizes
vidual hopper into a structurally sound,
assembly which assures positive door fi
justable locks, cast steel hinges, and sy
tapered door flange make possible the o
able door fit permitting compensation fo
common irregularities of construction.
unloading is assured by dual door opera
method of controlled flow.



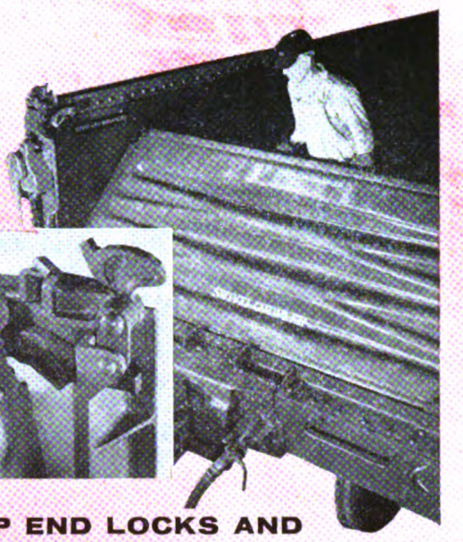
BOTTOM SPRING HINGES
DJUSTABLE LOCKS

tom Gondolas equipped with these two
lucts provide the shipper and receiver
ing with a positive closure and afford a
omical one-man operation, with selec-
or multiple opening of doors.



INUOUS LADING BAND
OR

continuous offset bar for top-coping
ons provides a secure anchor for lading
ery 7½ " of its entire length. Permits the
types of banding material.



DROP END LOCKS AND END BALANCERS

The *complete* drop end combination from operating and security standpoints! Interlocked corners provide rigidity to keep the sides from spreading under load. The balancer incorporates the hinge function . . . permits a one-man, time and labor saving closure.

UNIVERSAL LADING BAND ANCHORS

Easily applied on all flat cars and gondolas, the Wine Universal Type Anchor features 360° rotation for tie-ins from any direction. Versatility of use permits welding on coping at important locations as well as mounting in the floor. Drop flush when not in use.

ISTABLE HOPPER
R LOCKS

justment feature allows compensation for
ction differences and readily permits ad-
its necessitated by wear. Wine Adjustable
Locks are adaptable to built-up, struc-
opper openings as well as cast steel frames.

WINE

THE WINE RAILWAY
APPLIANCE COMPANY
TOLEDO 9, OHIO

Coordinated Mechanical Association Meetings

(Continued from page 32)

Lubricating Pads

Presently, there are between 325,000 and 360,000 freight cars with lubricating media other than loose waste. Approximately 1,600,000 cars are waste lubricated. In the past two years, when large-scale lubricator applications have been made, these devices have been going under about 10,000 cars per month. To comply with Interchange Rule 3 on the date of January 1, 1960 for the elimination of all loose waste, it would be necessary to equip cars at the rate of 90,000 per month for the next 18 months.

While "a considerable number of railroads are reported to show better than a three-to-one" performance improvement for lubricating devices, "there is a pressing need for improvements in the pads themselves," the Committee stated. Principal shortcomings are in materials, wicking, tendency to displace under impacts, limited journal contact area, lack of interchangeability, renovation difficulties and susceptibility to damage. Rapid deterioration of pad materials, lack of resistance to wear and abuse, lack of resiliency, and weaknesses in sewing all present fields for investigation, according to the Committee.

The tendency to shift, roll and distort is a characteristic of a number of pads which should be eliminated. Road tests on one road showed that pads which had shifted or rolled would operate 10 to 25 deg warmer than when they were in their proper position. At the same time, the Committee commented on the fact that some lubricating devices require alterations to box interiors which make it difficult to substitute any other lubricator in event of failure.

Journal Stops

With 10,000 sets of journal stops in service, the Committee reports the following:

- Better load distribution and bearing wear with less spread linings.
- Less damage to dust guard and oil seal.
- Better performance from lubricating pads.
- Fewer hot boxes.

Truck maintenance is an important factor in hot box prevention. Conditions contributing to improper load distribution on bearings include bent spring planks, broken truck springs, fouled center plates in need of lubrication, loss of side bearing clearance, flat wedges and worn journal box roofs, and defective wheels.

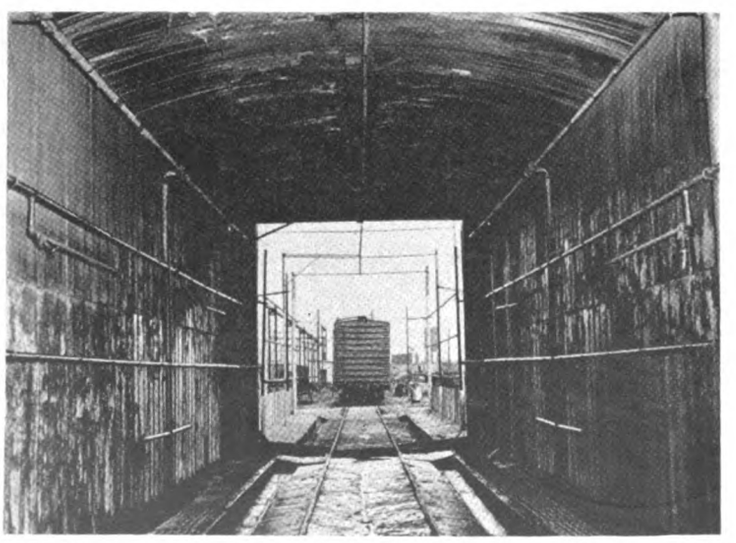
Controlled-Clearance Bearings

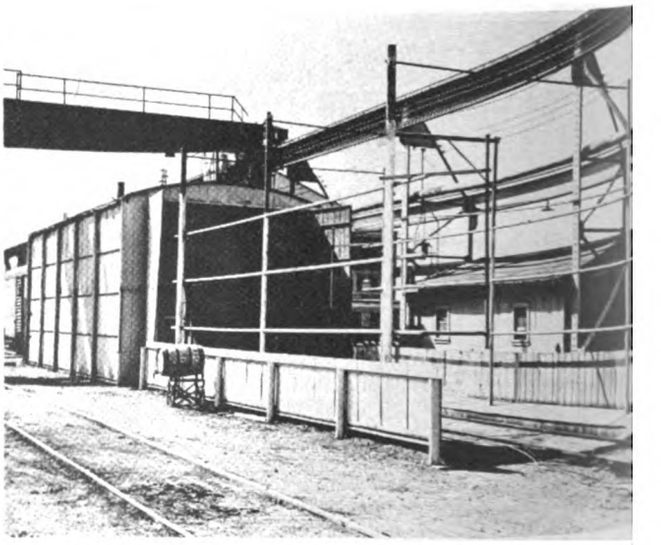
The results of using controlled clearance bearings have not been too encouraging. The Committee said that there is no clear-cut indication that their use has contributed to lowering the hot box rate.

There are numerous cases of errors in using these bearings. During a 52-day check at repair tracks and car shops of one railroad, 209 cars were found with the wrong bearing applied. In these 209 cars, 45.5 per cent of the mis-applications involved the use of A-3 bearings where A-1 bearings should have been used. In another ol check, an additional 121 cases were fo and these were all discovered because th were operating above normal temperatu The railroad found that even properly a plied controlled-clearance bearings ope at above normal operating temperatu The bearings wear across the entire bea surface. Overheating was attributed to shearing of the oil film by the sharp ed left on the lining metal. With 0 (20) clearance, the new bearing shortly wo so that the edge acts as a wiper on th oil film.

The Committee commented that: . good engineering practice to chamfer t edges of the lining metal on bearings diesel engines, line shafts and for simi applications. It was also standard practi on steam locomotives. Bearings in inter combustion engines are pressure lubricate In the car bearing assembly in which t must be carried on the journal surfa from the reservoir at the bottom of th box, there is need for chamfer. The Com mittee suggested that the AAR study th possibilities of making a chamfer on th front and back of the bearing.

Today's dust guard "has never fu tioned as intended", the Committee state Oil-saturated trucks, car floors, rails an ballast are all consequences of substitute pads for loose waste. While there was som oil loss with waste, the problem has be intensified by the introduction of pads. O road reported that as much as 15 oz of is lost per 1,000 miles from some journ boxes. Some roads are reducing the quan tity of free oil maintained in boxes. On requires that the depth of this oil be more than ½ in., another ⅝ in. and third ¾ in. The committee said that wh there is little oil loss under the lid w





Norfolk & Western paint stripping at the Portsmouth, Ohio, shop was described for the CDOA Committee on Painting. A hot alkali is used for paint removal. In four years, 3000 box cars and 18 covered hoppers have been stripped. The solution is applied to the cars through nozzles at temperatures ranging between 160 and 170 deg F. The alkali collects in troughs and flows back to the storage tank for reuse. A box car can be stripped in 5 to 10 min, depending on the number of coats and the type of paint applied to the car.

After stripping, the car is rinsed with cold water and then sprayed with a 5 per cent phosphoric acid solution. The car again rinsed. This is done outside the stripping shed, and th same nozzles apply both the phosphoric acid and the rinse wate

The entire operation is performed by one man. "Since th stripping operation was started," W. A. Faris of the N&W re ported, "we have inspected many of these cars and we find th paint to be holding up very satisfactorily with practically n peeling. We consider that we are obtaining highly satisfactor and economical results with this stripping system."

ıal conditions, lid seals do keep dirt water out of boxes. Lid seals must t least ⅜ in. thick to fill the irregues between box lips and lids. "An uate dust guard and oil seal has yet to be developed," according to the committee, "and it appears that a positive oil seal cannot be made for the present type axle and journal. It is one of the primary problems which must be solved."

.ir Brake

essive Heat Costly to Brake Equipment

HERE IS no limit to the number of ing cycles which AB and AC equipt can be exposed if critical tempera- s of 170-180 deg F are not exceeded n air brake equipment is exposed to rnal heat to thaw out frozen loads of , ore, crushed rock, sand and gravel, Central Air Brake Club reported to Air Brake Association.

ımong the thawing methods used, open ıe, hot air and infrared heating require :ful control of temperatures and proive equipment. The open flame is bably the most widely used method thawing hopper and similar bottomɔading cars. This heating does the most ıage to paint and car structure, as well air brake equipment, because it is estially uncontrolled. Methods range n the building of fires under the car h wood, coal or oil to the use of flame ɔwers or torches fired with gas or oil. The limitations with respect to the damng of various parts of the brake equipnt are:

- Maximum internal temperatures of 170 to 180 deg F can be tolerated in AB and AC without detrimental effects.
- Internal temperatures of 250 to 300 deg F cause the following types of permanent damage: slide valve leaks far beyond code limits which do not correct themselves when the valve cools down; loosening of service and emergency portion bushings; warping and distortion of covers creating leakage and misalignment; break down of lubrication; or damage to rubber parts.
- Reservoir flange gaskets can withstand temperatures of 240-250 deg F without excessive rubber flow or leakage.
- Wabcoseal pipe-fitting compression seals withstand internal temperatures of 190 to 200 deg F without detrimental effects.
- Brake cylinder lubricant will remain stable at temperatures below 200 deg F. Components of the brake cylinder will withstand 200 deg F.

Oven tests were run with AB and AC .lves at various intial temperatures from inus 40 deg to plus 70 deg. The times reach a critical internal temperature of 75 deg were tabulated. Results showed e AB valve was 20 to 25 per cent ɔwer to heat internally than the AC ılve. The effect of paint color was also checked during this test. In 40 min of exposure the black portion skin temperature of the AB valve equalled that obtained in 60 min with the gray portion. There was less difference in skin and internal temperatures with the black paint. The same internal temperature was reached in 23 min with a black AB emergency portion as in 60 min with a grey portion.

An AB emergency portion, painted gray, was subjected to eighteen 60 min radiant heats, being allowed to cool to room temperature between each test. The only noticeable effect of the heat was that the slide valve leakage increased as much as 7½ cu in. per min during heating. When the valve cooled, the leakage returned to test code limits.

Extensive investigation of radiant heat thawing were made during the past winter on one railroad. The heat sources were re-arranged to avoid excessive heat on air brake hose and other equipment. When the temperature of the various devices was kept within the critical range, valves and other parts went through the equivalent of nine years service. No rubber parts of the AB and AC equipment showed any apparent adverse effects.

Various means of protecting air brake devices from elevated temperatures—asbestos blankets, box housings and shields —were discussed. At best, they are expensive, time consuming to apply, and hamper routine maintenance and inspection. Some of the detrimental effects that can be expected from temperatures in excess of 170-180 deg are excessive brake pipe leakage, and stuck or inoperative brakes.

Torch methods and high temperature heating sheds can cause considerable damage to brake rods and rigging. Rigging can be severely stretched so that slack cannot be taken up unless the car is shopped for repairs. This stretching is caused from having the hand brake or air brake applied when thawing the car with a high uncontrolled temperature.

Heat Penetration in Control Valves
Exposed to Single Radiant Heat Source
(Temperatures are in Deg F)

Exposure Time, minutes	15	30	45	60
AB Valve				
Skin temperature	156	193	220	240
Internal temperature	117	138	152	171
Cast Iron AC Valve				
Skin temperature	142	168	188	203
Internal temperature	131	159	178	195
Aluminum AC Valve				
Skin temperature	167	202	225	242
Internal temperature	136	169	193	212

Modified Air Tests Could Save RR's 3,200,000 Man Hours

A STATISTICAL analysis of air brake defects contained in the Montreal Air Brake Club report to the Air Brake Association is the first phase of the problem of determining economic balance between the amount of air testing necessary on freight cars and the benefits to be derived.

Modification of the single car test device and a modified test routine to detect the two most prevalent air brake defects indicate an air tester could increase his productivity from an average of 12 to an average of 30 cars on an 8-hr shift.

The AAR requires all repair tracks use the single car testing device equipped with a flowrator designed to detect brake system leakage. At present, all cars due for indate testing must be completely tested by the railroads in compliance with the Single Car Code of Tests, involving the following operations: Charging Test, Application Test, Slow Release Test, Service Stability Test, Piston Travel Check, Emergency Test, Release After Emergency Test, and Retaining Valve Test.

The purposes of a study, made by a large Canadian railroad to investigate freight car air brake testing procedures on repair tracks, were to check efficiency of the test routine and ultimately to determine the amount of testing necessary for safe train operation. A committee was instructed to make a system-wide survey and recommend any new methods which would increase efficiency.

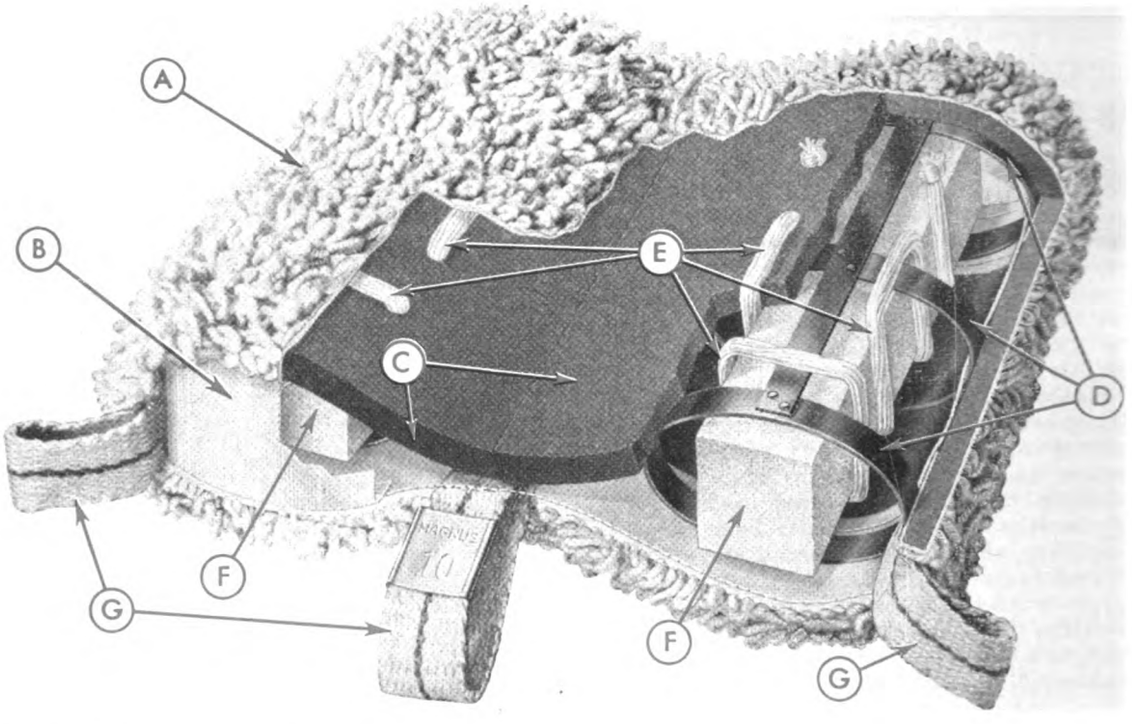
One phase of the survey indicated that one man could test properly, correct leakshift. At an average of 40-min per car, age, and adjust piston travel when necessary, on an average of 12 cars in an 8-hr and if performed four times per year, it would amount to over five million man hours per year for more than two million freight cars in US and Canada. The survey also revealed that largely due to time consuming charging periods, the non-productive time of an air tester was in many instances over 15 min per car.

To increase the air tester's output within existing test rules, a standard air brake testing truck incorporating a separate charging line was used. By having a specified routine for its proper use, the tester's average daily output per 8-hr shift could be increased from 12 to 16 cars. A 25-ft charging hose would enable the tester to move from one track to another in case cars are not in sequence along a single track. Performing the work in accordance with the new instructions requires about 30 min per car test, a reduction of 10 min from the original average testing time. This would result in a saving of 1,300,000 man hr annually air-testing two million freight cars at 3 month intervals.

(Continued on page 40)

NOW—A CAR JOURNAL LUBRICATOR DESIGNED AN

IT'S THE NEW MAGNUS



FEATURES and ADVANTAGES

(A) **Outer Cover** of tufted premium quality cotton yarn with heavy duck backing provides an ideal application and absorption surface which is glaze-resistant. It is washed and shrunk prior to assembly, assuring proper fit, and is stitched at both ends to prevent raveling and bunching in service.

(B) **End Covers** of cotton bolting cloth web assure lasting strength and flexibility—keep dust and dirt out of the internal wicking materials—restrict oil loss.

(C) **One-Piece Felt Pad** backs up the tufted cover and is formed around the two sets of steel springs and sewn together on the center line to make a single pad, with twin-lobe design—a far more rugged construction with better capillarity than if two separate pads were sewn together.

(D) **Flat Steel Springs**—three firmly connected springs in each lobe maintain constant and correct pressure on the journal. Scaleless tempered spring steel will not sag and allow the pad to fall away from the journal. The springs are firmly secured to the underside of the felt and cover and are riveted to spring steel spacer strips—a construction that positively prevents misalignment or contact of springs with the journal.

(E) **Internal Wicks** of 25-ply Bostonia provide 16 supplementary oil paths from the bottom to the top of each Magnus Lubricator Pad. Thus the design includes a combination of circumferential wicking, internal wicking and center feed wicking, assuring ample oil flow under all conditions.

(F) **Polyurethane Cores**—used solely to increase oil reservoir capacity—make for greater margin of safety in event of oil starvation by contacting the 16 internal wicks.

(G) **Extra-Strong Loop Handles** extend through pad centers, will withstand a pull of 300 pounds before failing. Additional loop handles are provided at each of the four corners. Brass nameplate on center loop carries the size identification. Magnus Pads are currently available in standard sizes for 5 x 9, 5½ x 10 and 6 x 11 car journals.

MAGNUS Solid Bearings

MAGNUS METAL CORPORATION

T BY JOURNAL BEARING EXPERTS

IBRICATOR PAD

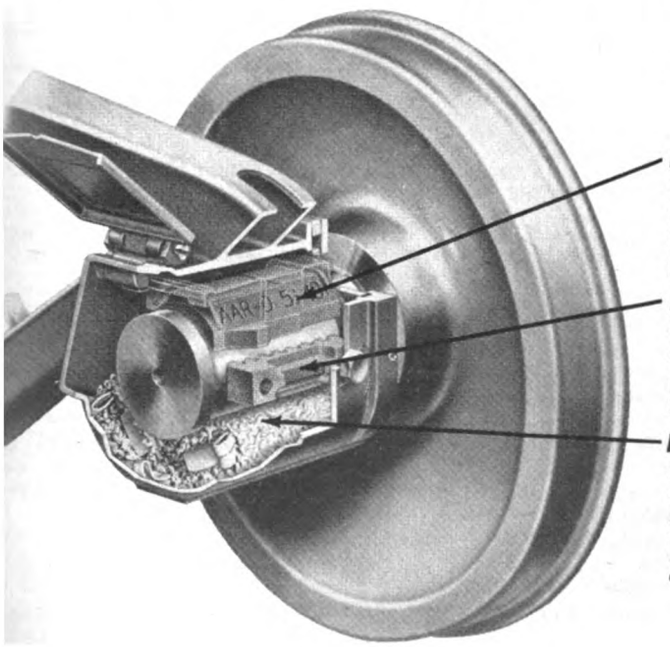
ay wicking, large oil capacity, rugged one-piece twin-lobe :truction are features of the MAGNUS journal lubricator 's now approved by AAR for interchange test installations

T YOU need in a lubricator you get in the lagnus Pad. First, there's maximum wicking :umferential, internal, and center feed — to e cooler operation and a far greater margin ety in event of oil contamination. Internal are *not entrapped* — wick more oil and are y cleaned through normal reclamation process.

:n there's high oil-retention capacity — fully ted, each Magnus Pad will hold more than mes it's own weight in oil — better than 5.9 for the 6″ x 11″ size.

e cover is heavy pre-shrunk duck tufted with ium quality cotton yarn (proved the most prac- design) and backed with high capillarity felt. It's positively held against the journal at all times by elliptical tempered steel springs that eliminate sponge-type uplift media. The springs are firmly secured to both felt and cover. The whole is a unique one-piece twin-lobe reversible design, self-centering on the journal — end-enclosed to restrain loss of oil. It's a lubricator pad designed by bearing experts to give railroads the performance needed.

Get the full story on the NEW MAGNUS LUBRICATOR PAD. We will gladly send you complete information and answer any detailed questions you may have regarding its construction and operating characteristics. Write to Magnus Metal Corporation; 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4, Illinois.



For Tops in Bearing Performance at Lowest Possible Cost

Magnus Solid Bearings—Are easy to maintain or replace. They can take the maximum load, make the fastest schedule. They save excess weight and have the lowest possible running resistance in pounds per ton.

Magnus R-S Journal Stops—Positively prevent excessive axle displacement during impact, braking, switching and humping. The result is better bearing performance with far lower maintenance, doubled bearing life, and reduced wheel flange wear.

Magnus Lubricator Pads—Provide a constant and uniform oil film for solid journal bearings. Three-way wicking, large oil reservoir capacity, rugged one-piece twin-lobe construction—these are three of the features that make Magnus Pads your best bet for efficient pad journal lubrication.

liary of **NATIONAL LEAD COMPANY**

Coordinated Mechanical Association Meetings

(*Continued from page 37*)

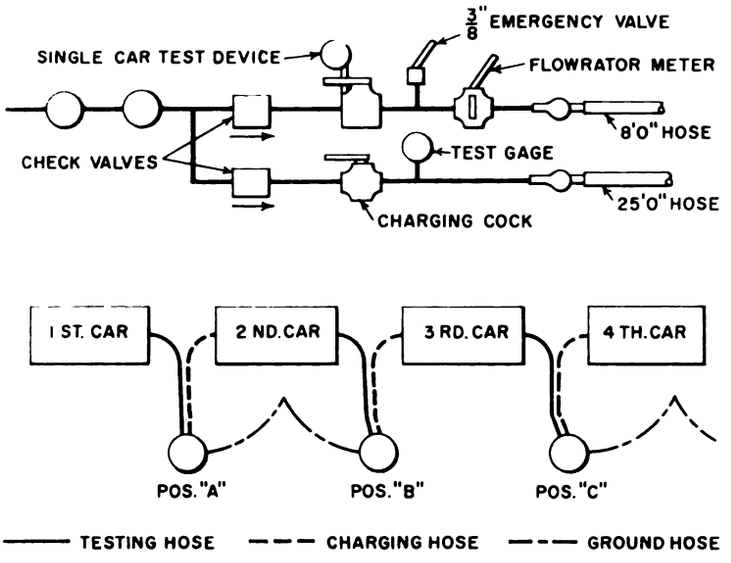
With the above savings in mind, the committee then conducted a survey on four major repair tracks in Canada to determine the percentage of failures detected in each test called for in the Single Car Code. By concentrating only on those individual air tests which detect most of the defects—air leaks and brake cylinder piston travel—air brake detention time in terminal yards might be reduced.

The results of air tests on 27,000 cars showed that approximately 46 per cent were trouble-free and that 49 per cent tested required piston travel adjustment. This represents 91 per cent of the cars having defects. In addition, about 23 per cent of the tests revealed air leakage in excess of the condemning limit. All other tests required by the Single Car Code detected defects on only 2.5 per cent of the cars, or 3.34 per cent of the total number of defects. These suggest the flowrator meter test and a 20-lb reduction to determine piston travel would detect most of the air brake defects on a freight car.

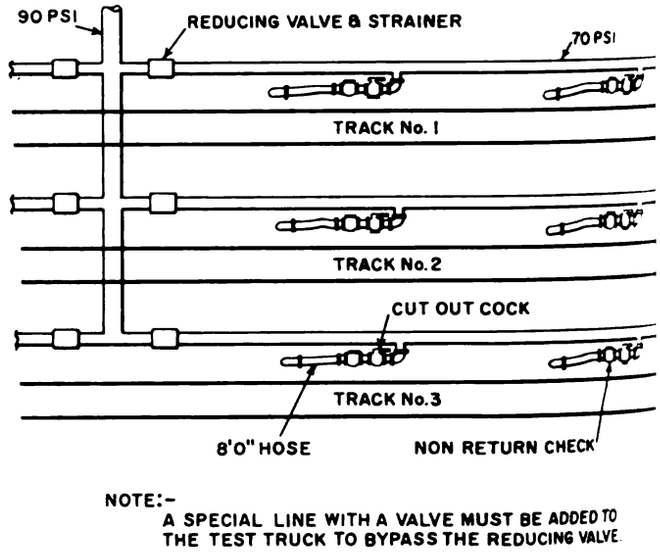
A modified test was performed on 729 cars that would detect the two most prevalent leaks. Pipe lines were installed adjacent to the tracks on a section of one large repair track to permit the simultaneous precharging of all cars assigned for air testing on each shift. The air tester was instructed to check each car for air leaks with the flowrator meter, make a 20-lb reduction to check piston travel, and then release the brakes. The air tester also made the necessary corrections when air leakage was detected, and adjusted piston travel when required.

This method showed that the air testers productivity could be increased to an average of 30 cars tested per 8-hr shift. This is equivalent to an average of 16-min per car when performing the mo... 40-min when testing in acc... the Code of Tests—a saving... per car. Test results showed t... cent of the cars had either ... or defects that could be detecte... ing for air leakage with flowra... and then making a 20-lb red... check piston travel. Assuming a... of eight million in-date tests per ... modified test would result in a s... 3,200,000 man-hr annually to the ...

The committee, however, feels ... evaluation of the 2.5 per cent of cars ... defects going into service will have t... made before considering this savi... advantage. To do this, they strongly ... the Air Brake Association to carry ... work into its second phase—evalu... the consequent cost of certain undetec... defects to train operation. The stat... frequency of occurrence of defects ... cost will make it possible to determin... the basis of probability, the extent ... which the Single Car Code of Tes... be modified for in-date testing.



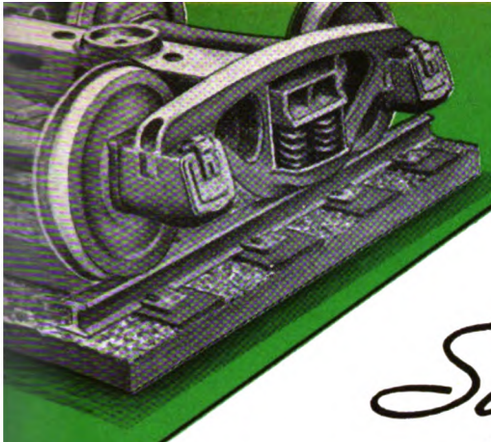
Proposed simplified brake test routine could be used as shown here. An additional charging line is needed for this operation.



Piping on typical repair track would be as shown here. Special line ... valve must be added to test truck to bypass reducing valve.

The Proposed Inspection Routine:

1. Place the testing device in position "A" and connect the test hose to the first car and the charging hose to the second car. Make sure that the angle cocks are open on both cars.
2. Close the charging cock on the test device and place the test valve handle in No. 1 position.
3. After blowing out the ground air line, connect the testing device inlet hose and the open ground air cock.
4. Blow out the trainline on the first car and apply the dummy coupling. Allow the first car to charge in accordance with instructions contained in the Single Car Code of Tests.
5. When the first car is completely charged and passes the flowrater meter test open the charging cock on test device.
6. Blow out the trainline on the second car and close the angle cock.
7. Commence testing the first car in accordance with the instructions contained in the Single Car Code of Tests.
8. During the release portion of the slow release test, close the charging cock on the test device. Open this cock after the brakes have released.
9. After the first car is completed, close the ground air cock, close the charging cock and open the 3/8-in. emergency cock on the test device.
10. Close the angle cock on the second car and disconnect the test charging and inlet hose.
11. Move the testing device to position "B" and connect the test hose to the second car and the charging hose to the third car.
12. Close the charging cock and place the test valve handle in No. 1 position on the testing device.
13. After blowing out the ground air line, connect the testing device inlet hose and open the ground air cock.
14. Open both angle cocks on the cars ... position "B", then remove the dumm... coupling from the first car. Wh... walking back to the second car, ... and release the air from the first ca...
15. Apply the dummy coupling to ... second car and open the angle cock ... slowly to prevent an emergency appli... tion.
16. After the second car has passed the flowrator meter test, open the charging cock and blow out the train-line on the third car, then close the angle cock.
17. Test the second car in accordance wi... instructions contained in the Sing... Car Code of Tests.
18. When the second car is complete... tested, follow the same routine be... tween the third and fourth cars and ... so on along the line.
19. When testing the last car on the shift ... the charging cock on the device is to be left closed.



MEMO FROM THE GENERAL OFFICE

Jim—Still too many hot boxes Suggest using Acme Lubricators

The JBS ACME LUBRICATOR is a Positive Advance in Journal Lubrication

- ★ Retains 4 times its own weight in oil
- ★ Requires no modification of journal box
- ★ Wicks AAR specification car oil even in coldest weather
- ★ Assures better performance with less servicing
- ★ Cannot Glaze—Wool-cotton chenille loop surfaces
- ★ Has exclusive patented all-wool quilted core*
- ★ Reinforced for extra wear
- ★ Readily reclaimed

Complimentary reports are coming in from scores of railroads throughout America, Canada and Alaska using JBS Acme Journal Lubricators, a product of the Journal Box Servicing Corporation, that JBS Acme Lubricators are greatly reducing hot boxes in their operations. JBS Acme alone has the exclusive all-wool quilted core* which retains many times its own weight in oil reserve. Heavy chenille loop pile surfaces assure an ample supply of filtered oil at all times and prevent glazing. JBS Acme Lubricators are unaffected by temperature changes and wick AAR specification car oil even at 45° below zero in road service tests. JBS Acme Lubricators require no modification of the standard journal box, are designed to hold their position in the box, and assure better performance with less servicing.

Write Today for Information and Folder

GUARANTEED
Quality, Workmanship and Material as represented

ght 1958—Journal Box Servicing Corp.

*Patent applied for

OURNAL BOX SERVICING CORP.

"30 Years in Car Lubrication"

SALES OFFICE: 332 S. MICHIGAN AVE., CHICAGO 4, ILLINOIS
ENERAL OFFICES: 1112 E. KESSLER BLVD., INDIANAPOLIS 20, INDIANA
FACTORY, DALTON, GEORGIA

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SAN FRANCISCO, CALIF. • MONTREAL, QUEBEC

now the famous one-piece Morton OPEN-GRIP running board gives you

the UNI-WING flange

Stronger

Fully AAR approved

The rugged, die-formed flanges of the *new* Morton **Open-GRIP** running board *aid* installation, *eliminate* welded brackets.

Withstands rough treatment without damage.

Still the famous **Open-GRIP** KASS safety features and rigid edge construction for strength where it's needed.

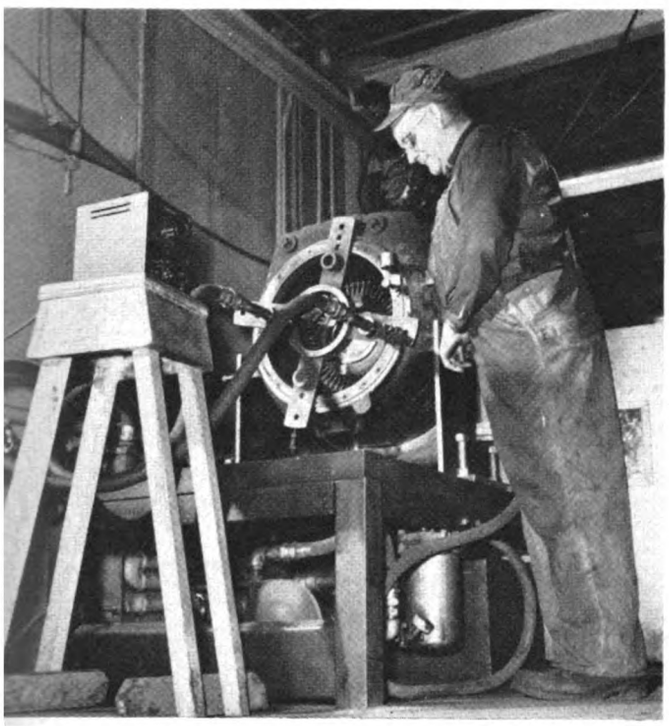
CLEARED TO PROGRESS RPI MEMBER

Morton MANUFACTURING COMPANY

5125 West Lake Street • Chicago 44, Illinois

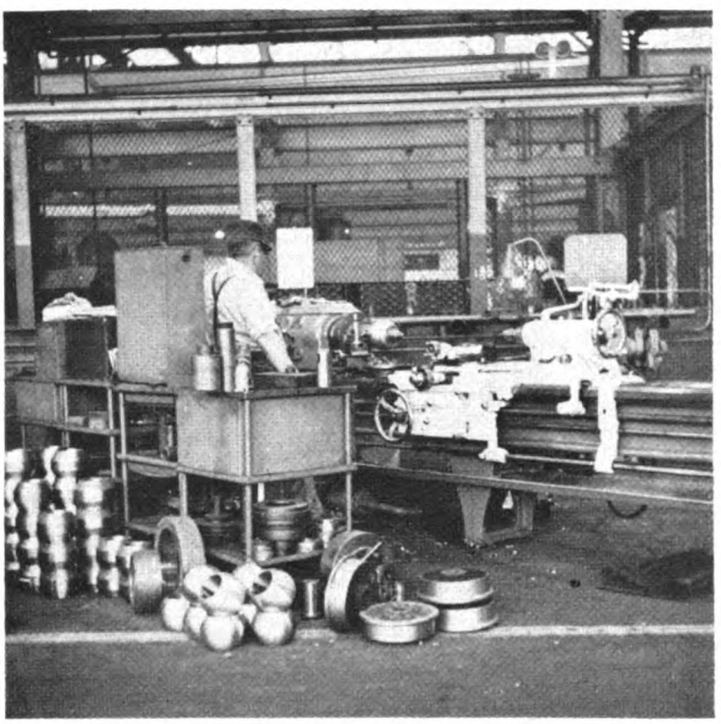
ESEL REPAIR TIME-SAVERS

·bocharger Test Stand



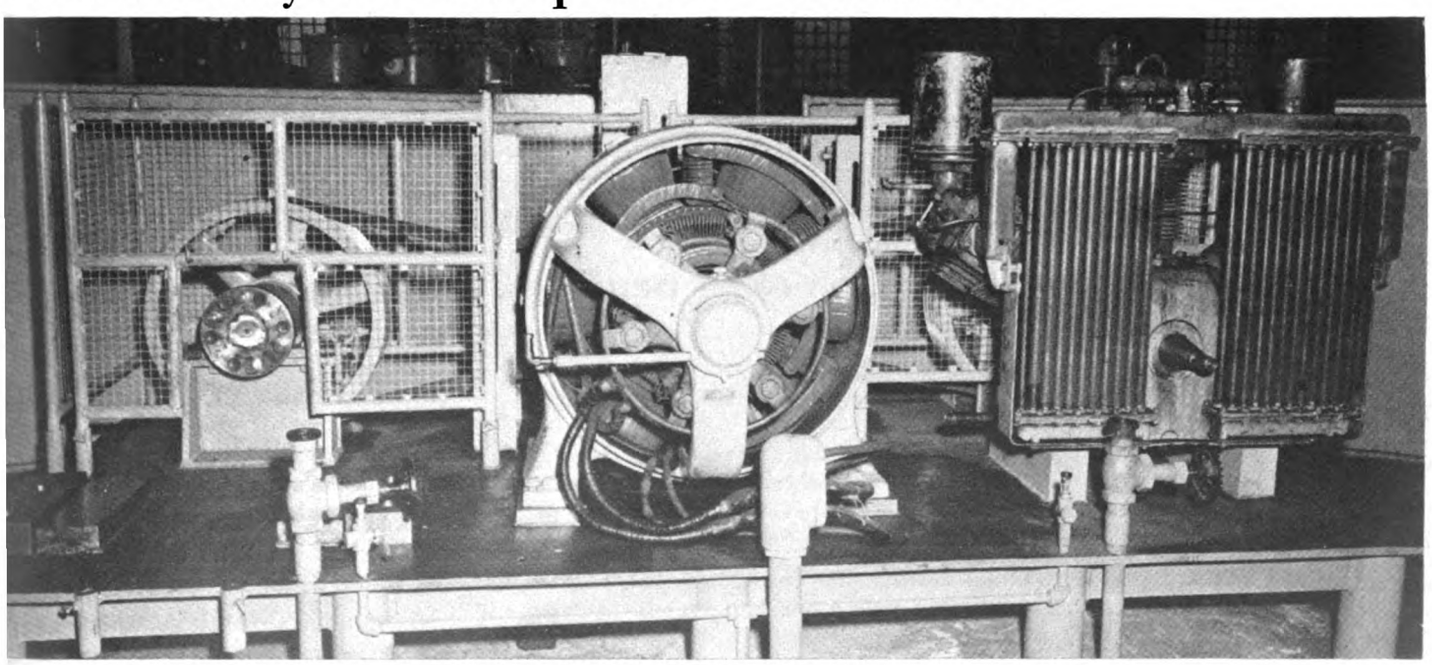
red turbocharger is operated with compressed air in this special
› at the Altoona, Pa., works of the Pennsylvania. Air streams are directed
: the blades to check the operation of the rotor and bearings. Speed of
on is checked and adjusted with readings from strobotachometer in
›reground.

Burlington Coupler Bushings

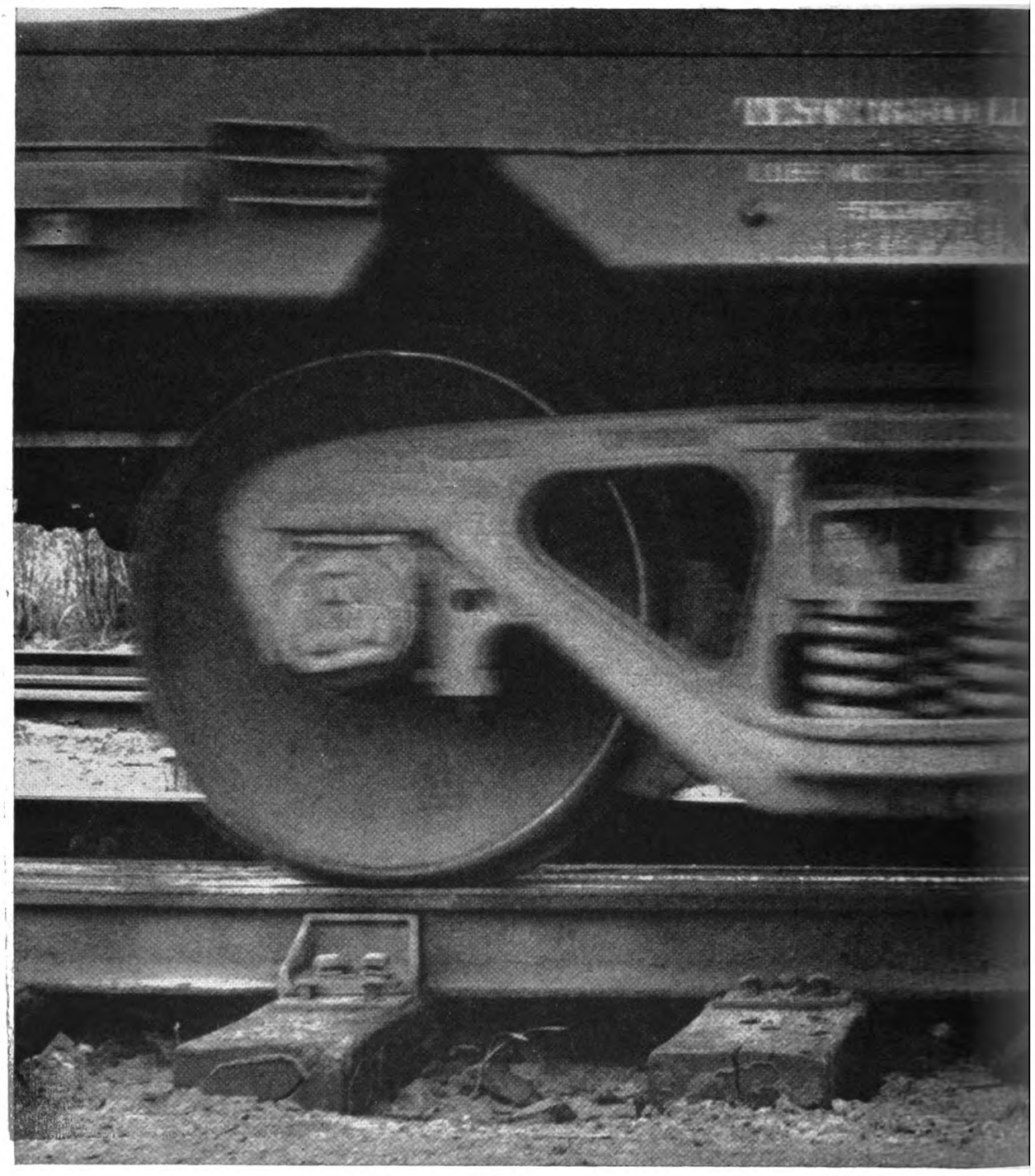


Ball ends for E couplers are being made in lots of 50 at the West Burlington, Iowa, shop of the Burlington at considerable savings. Scrap diesel axles are used. The balls are first rough-turned in a turret lathe. This machine lathe, equipped with an expanding arbor, has a special circular jig to cut the ball radius.

estern Maryland Compressor Test Stand



compressor test stand, designed and built by the Western Maryland at
Hagerstown, Md., shop will accommodate both Gardner-Denver and West-
ıouse compressors either for checking or break-in. Set-up time is mini-
ed by providing separate permanent mounting plates for both types of
hines. Compressor is driven through a V-belt drive from a 75-hp dc motor with speed controlled through a variable rheostat. Following rebuilding, the compressors are tested according to manufacturers' recommendations with records of air temperatures and pressures at various operating speeds recorded. Total test takes approximately 8 hr for either type of air compressor used on WM locomotives.



Where payloads roll on roller bearings... Gulf makes things run be

NEW GULFCROWN R.

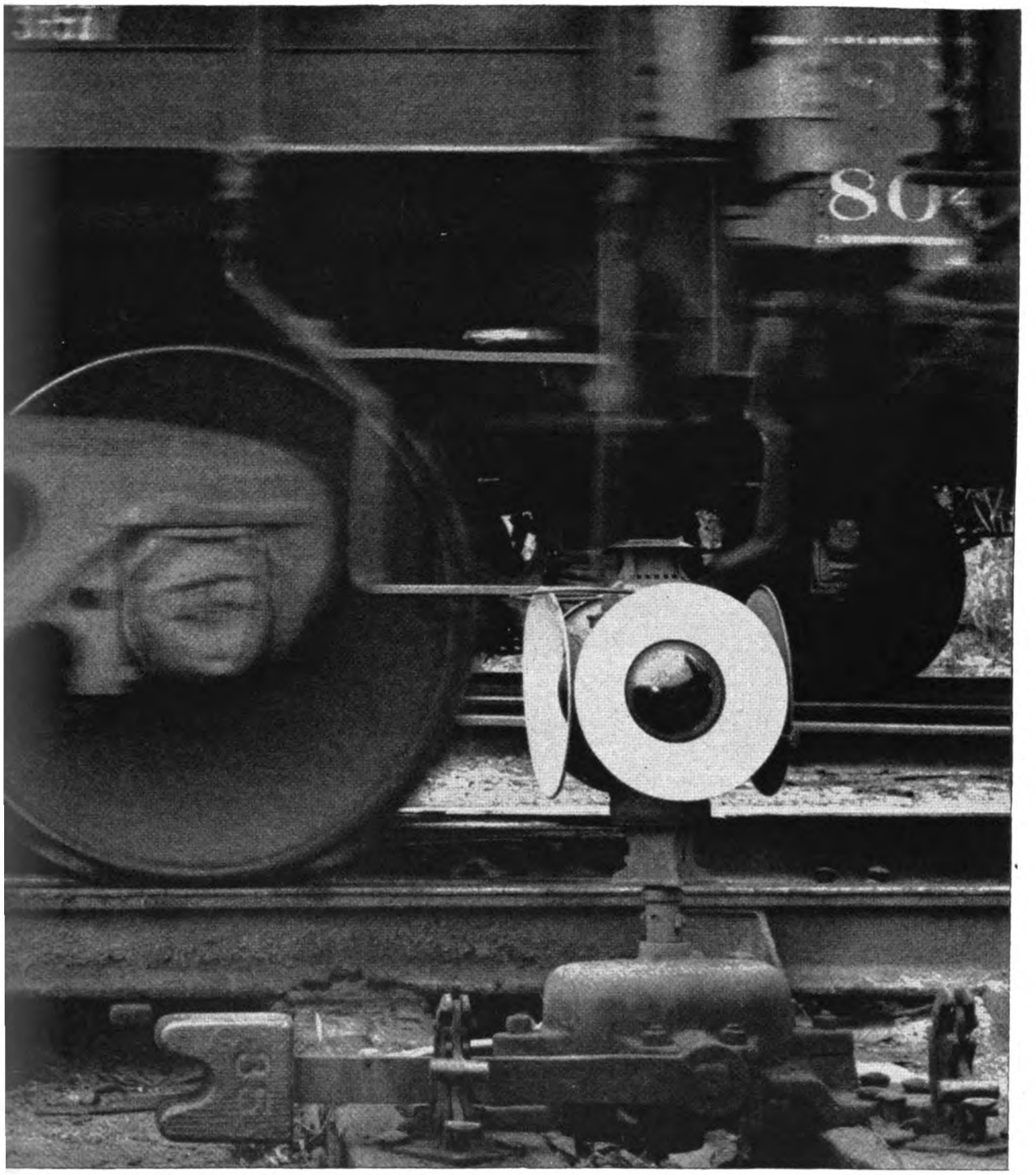
New Gulfcrown R.R. is a lithium base grease especially developed to provide better lubrication for railroad car roller bearing journals. It has been tested and approved against A.A.R. Specification No. M-917-56.

Stands up at high temperatures. New Gulfcrown R.R. has been used successfully in bearings operating at temperatures as high as 250° F.

Pumps freely at low temperatures. Gulfcrown R.R. Grease doesn't become hard, or unworkable, even w subjected to temperatures as low as 0° F.

Won't thin out at high speeds. Its excellent mechan stability keeps Gulfcrown R.R. from thinning out ur the churning action of high speed bearings.

Resists washing action of water. Won't wash a even under wettest conditions. Gulfcrown R. R. provides protection against rust.



REASE

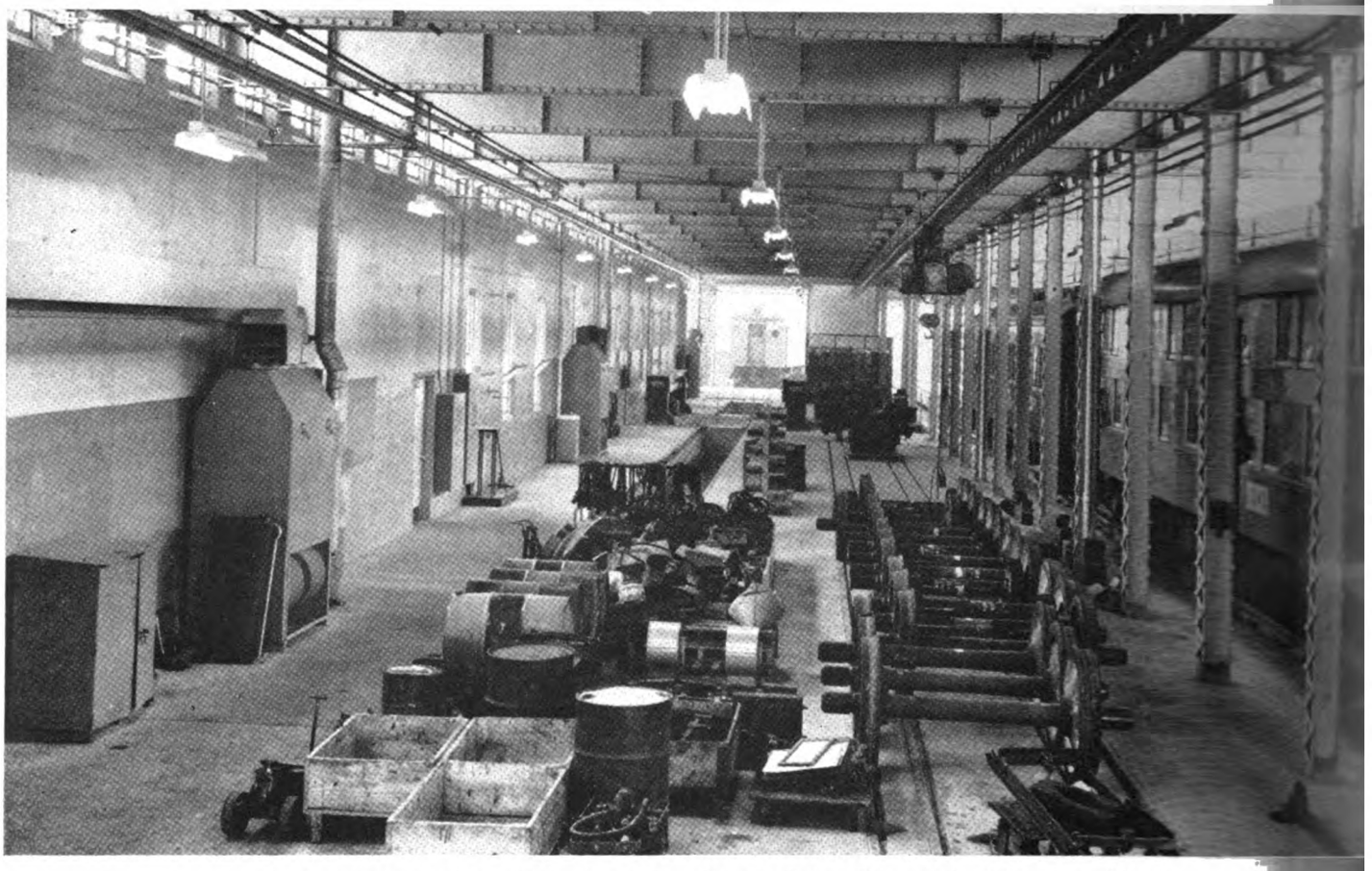
t oxidation stability. New Gulfcrown R. R. effectively inhibited against oxidation to insure , both in storage and in use.

wn R.R. Grease is available now, in 35 lb. pails, drums and 400 lb. drums. Let us prove that you more effective roller bearing protection—and maintenance costs—with this outstanding new Write or phone.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

GULF

ELECTRICAL SECTION



Truck repairs are made on track adjacent to south wall of shop. The area has 5-ton monorail hoist over wheel storage tracks. Shop is heated with gas space heaters and has fluorescent lighting.

Latest Aid to Better Operation . . .

Long Island's Dunton M-U Shop

A REHABILITATION PLAN started in 1954, has resulted in big improvements in the plant and service of the Long Island. Under this plan, the Pennsylvania loaned $5,500,000 to the Long Island and agreed to forego any dividend or interest payments on its $120,000,000 investment in the Long Island for a 12-year period. The plan contains a tax forgiveness feature which cuts the railroad's state, county and local tax bill approximately in half for a nine-year period. The railroad has been permitted to make fare increases totaling approximately 20 per cent.

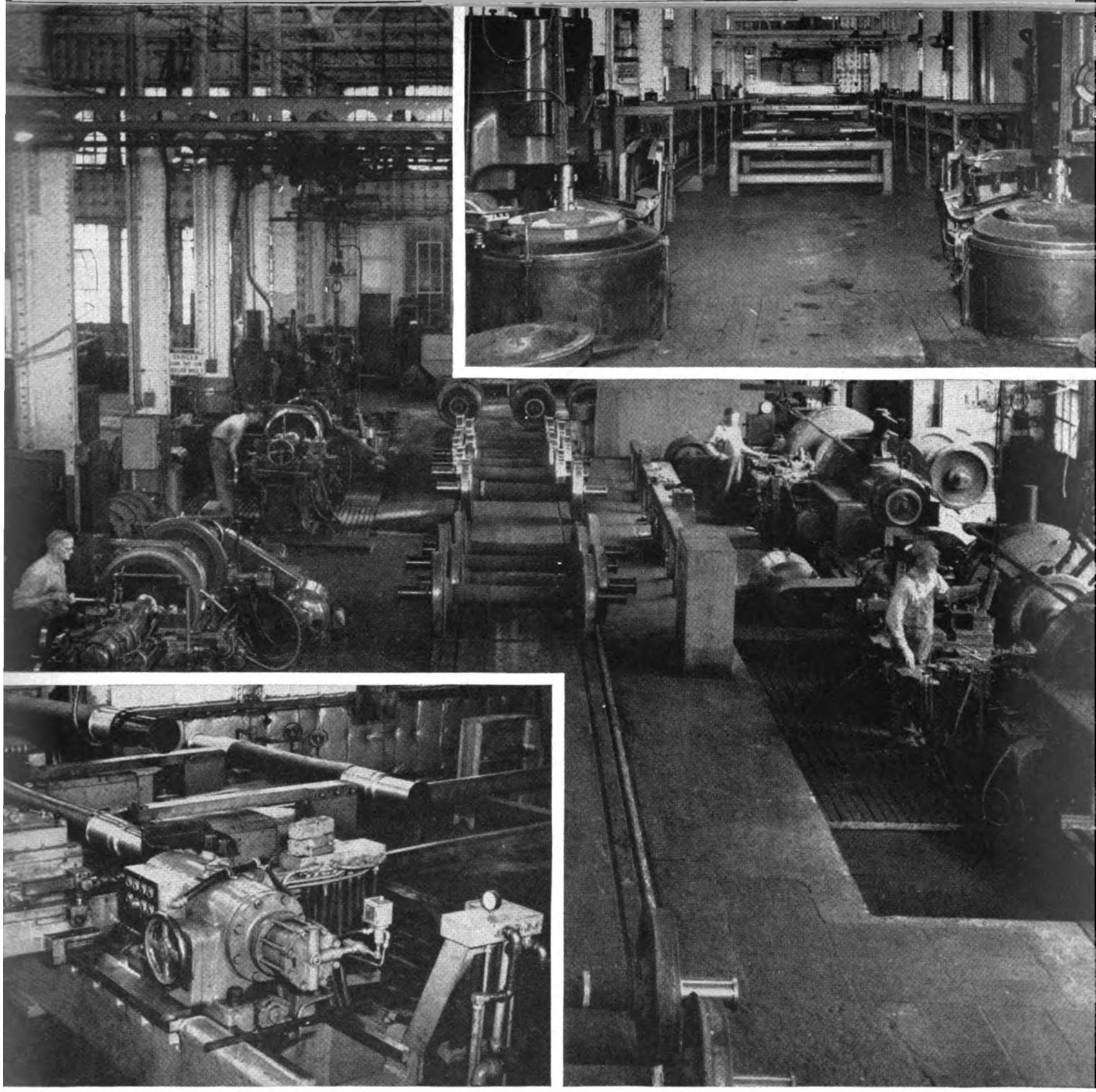
The railroad's response to this relief has been so quick and effective that in spite of fare increases, public criticism has almost disappeared. New air-conditioned cars were purchased (RL&C, September 1955, p. 88), old cars are being rebuilt, two-way signaling is being installed in congested areas, and schedules have been reduced. For the past year, the railroad has maintained an on-time record of 97.9 per cent.

Much credit for better performance is due to improved and new shop facilities. Now part of the railroad's main shop at Morris Park, L. I., is a fully-equipped, self-contained wheel shop. Before 1954, all wheel and axle work was done in a Pennsylvania shop in New Jersey. Morris Park shop has also been provided with other new machine tools and work has been systematized.

Traction motors afford one example of what has been done. Some years ago, a wave of economy caused the shop to wind its traction motors with Class A (cotton) insulation. As motors com for rewinding, this has been gradu eliminated; and now practically all motors have Class C and Class H ins tion. The number of motor failures been greatly reduced. An in-place wh grinder is used to restore tread flange contours without removing whe from cars or locomotives. The r road's 75 locomotives are all dies since all steam facilities have been eli nated.

The road's newest facility is the n completed mutilple-unit shop, loca at Jamaica, L. I. It was rebuilt fr the old shop which was erected in 19 The old shop, which had tracks for cars, handled 133 m-u cars. The n shop, with space for 36 cars, ma

(*Continued on page 48*)



One of the most extensive railroad machine shops is that of the Norfolk and Western at Roanoke. The above photos were taken in the Wheel Shop.

Norfolk and Western's Roanoke shops exemplify the completeness of the Niles machine tool line

The facilities of Norfolk and Western's Roanoke, Va., Wheel Shop are as extensive as the completeness of the line of Niles Railroad Machine Tools.

The Hamilton Division of the Baldwin-Lima-Hamilton Corporation supplies the nation's railroads with a complete line of moneysaving machine tools—from the sturdy, efficient Niles burnishing lathes and wheel lathes to the new Niles wheel borer with sidehead. Write today on your letterhead to Dept. 9-K for information.

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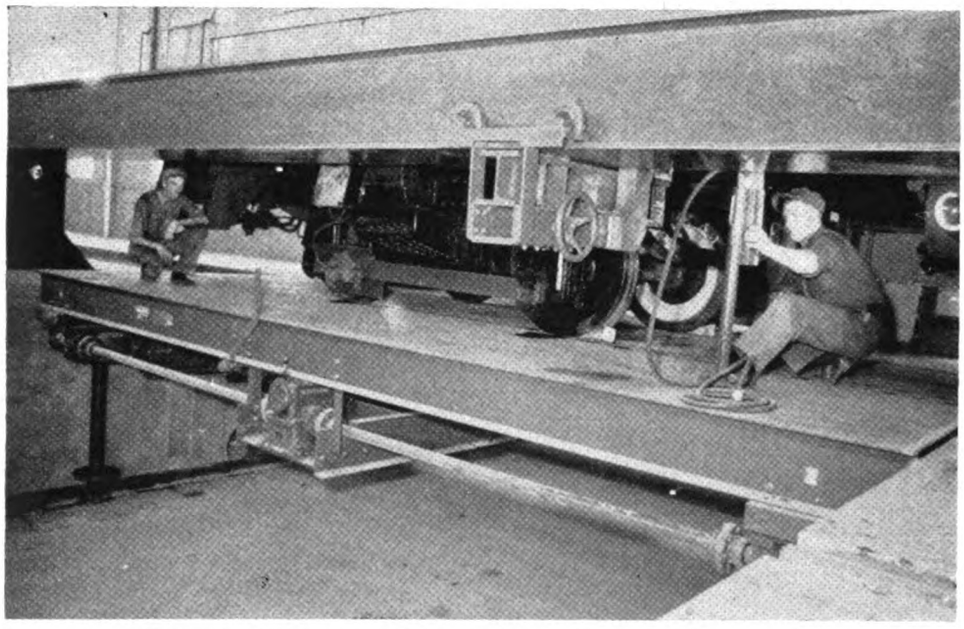
BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON



Movements of this Whiting Model C drop table are controlled at pushbutton station operated by man at the right. Truck is moved to special track for work.

Traveling trolley feeds third rail shoe motor man in the cab spots car.

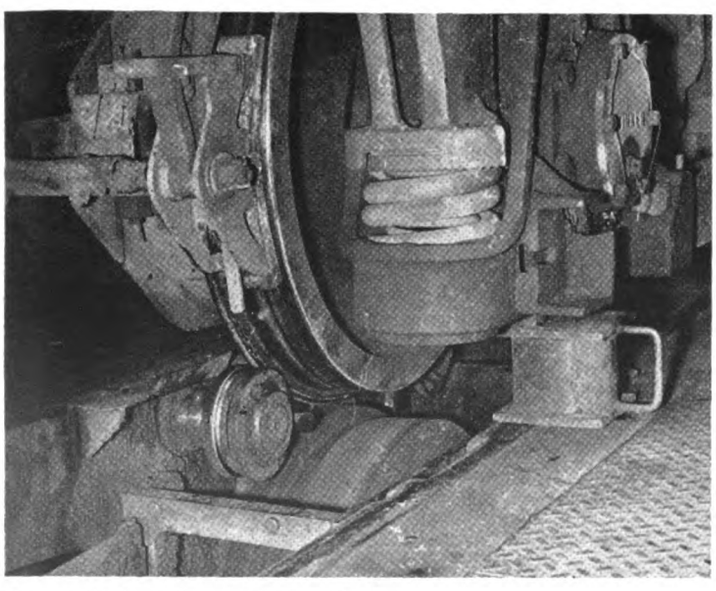
inspections and light repairs to more than 600 cars.

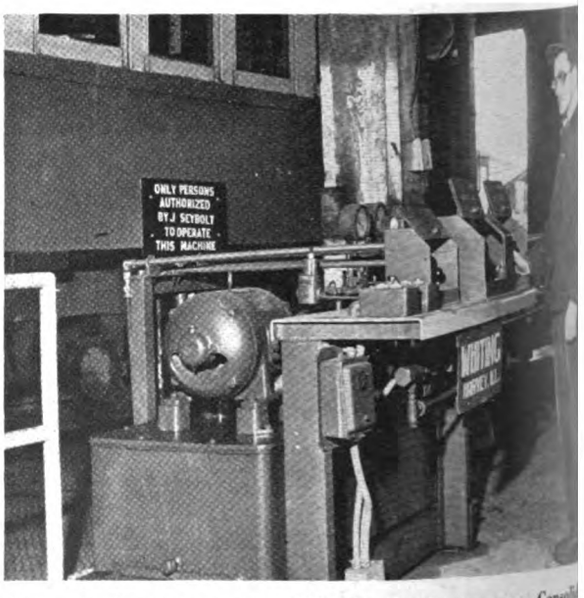
The shop is 134 ft wide by 444 ft long and has two all-glass walls. There are nine tracks, including six inspection tracks with full-length pits inside and one storage track outside. All pits have a continuous elevated step on each side. Also inside, is a truck track and wheel pit which occupy space on tracks 1 and 2. The interior is fluorescent-lighted. Inspection pits have incadescent lights, 110-volt a-c receptacles and 100-cycle speed control test outlets. These pits also have air outlets, and there are air outlets on the building columns, along with 110-volt receptacles and 440-volt, 3-phase outlets for welders. The building is heated with eight gas space heaters.

Service facilities extend along the north wall of the building. At the front is a six-desk main office and two private offices. Next is an air-brake room which contains an air brake inspection bench, drill press, two pedestal-type grinding wheels, two Ingersoll Rand 300-cfm motor-driven air compressors and lazy-Susan type parts bins. The comp supply air for blowing out equ for the operation of pneumat tools, and for setting feed valv safety valves of air brake equipm

Back of the air brake room a fare facilities and the battery roo in order is a drop pit under tr and 2, which provides for remov replacing trucks. When taken fr car, they are placed on the truck A five-ton monorail over this t used for changing out motor

(*Continued on page 52*)





Long Island's Wheel Shop

Newest equipment at Morris Park shop is the Whiting wheel grinder installed last year. During the past four years, the shop has been equipped with all the machine tools necessary to do both car and locomotive wheel work. These include one 48-in., Baldwin-Lima-Hamilton Model FFIH, wheel borer; two 400-ton Chambers-burg wheel presses; one 600-ton wheel press; one Consol 49-in., dual-end, journal and axle lathe; one Consolidated journal and axle lathe; and two 42-in. Sellers wheel lathes. equipment includes one Sperry Type UR Reflectoscope; on tionary Model 12409 Magnaflux; one portable Model Magnaflux; one Hammond Model CB77BW combination gr and one Gedding & Lewis cutter grinding machine.

Photo Courtesy Chesapeake and Ohio Railway Co.

58-46

Ex-Cell-O Pins and Bushings get the green light for many extra miles

Install them, then forget them for many extra miles of rough and rugged travel . . . over 200 U. S. and Canadian railroads do just that by installing Ex-Cell-O Pins and Bushings. Often get up to a million miles of trouble-free service.

A diamond-hard steel casing and a super-fine finish resists abrasive action caused by sand and grit. A soft ductile center *gives* instead of cracks when cars strain over rough terrain. Electronically controlled heat treating and precision grinding assure long life, extra service. An extraordinary service policy backs up Ex-Cell-O Pins and Bushings whether you buy them separately or assembled. So why not contact Ex-Cell-O, Detroit, or your Ex-Cell-O Representative soon?

EX-CELL-O
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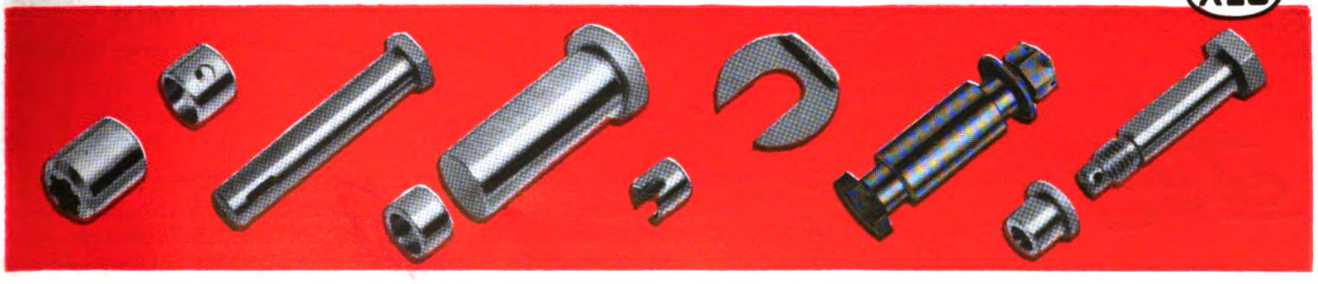
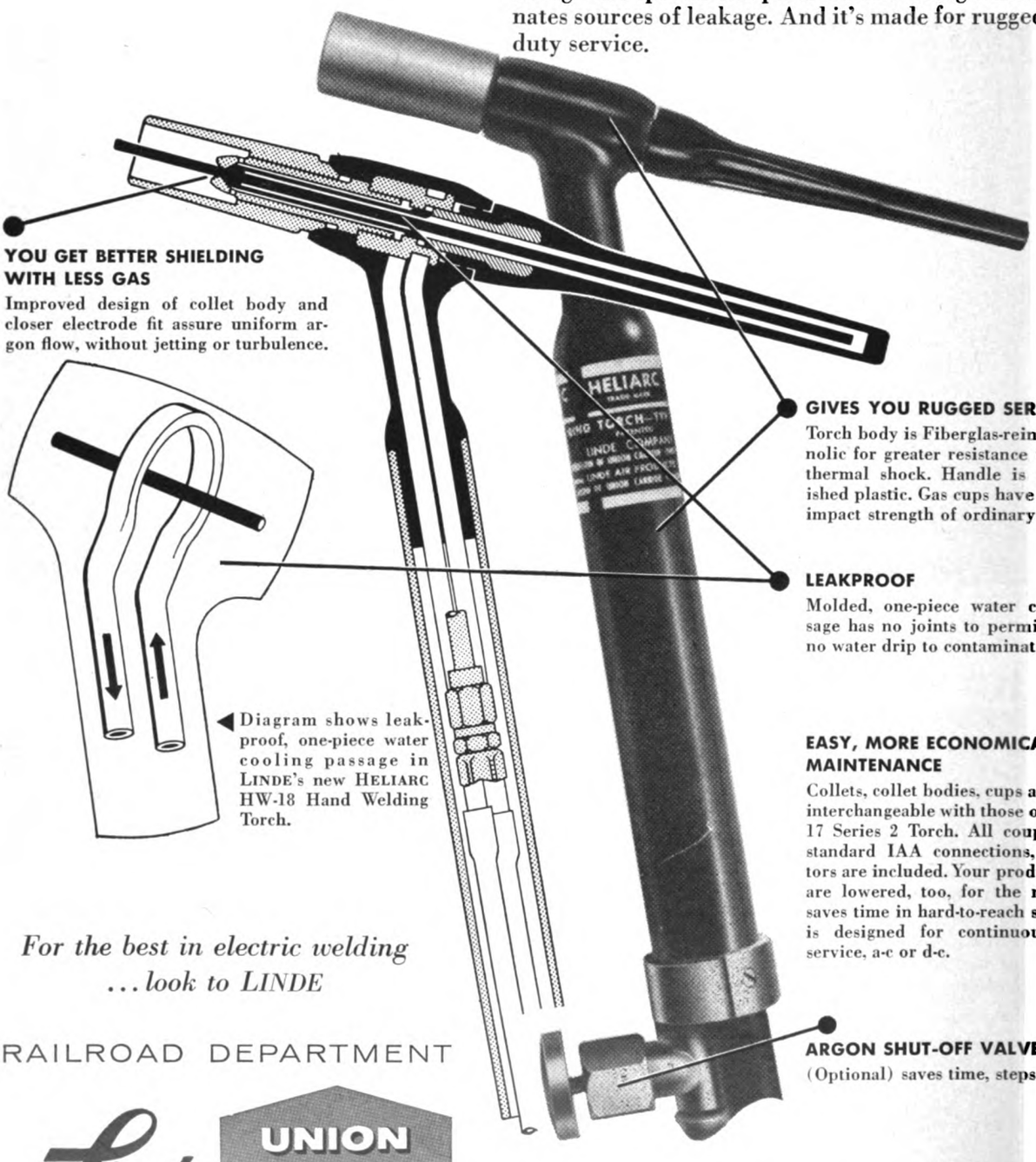
Railroad Division
EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

EX-CELL-O FOR PRECISION XLO



Here's a NEW WELDING TORCH that's WATERTIGHT... built for HEAVY-DUTY SERVICE ...yet weighs only 7 OUNCES!

This new HELIARC HW-18 Hand Welding Torch weighs only 7 ounces, making it easy for you to handle, less tiring. The special one-piece water cooling channel eliminates sources of leakage. And it's made for rugged, heavy-duty service.



YOU GET BETTER SHIELDING WITH LESS GAS

Improved design of collet body and closer electrode fit assure uniform argon flow, without jetting or turbulence.

◀ Diagram shows leakproof, one-piece water cooling passage in LINDE's new HELIARC HW-18 Hand Welding Torch.

GIVES YOU RUGGED SERVICE

Torch body is Fiberglas-reinforced phenolic for greater resistance to heat and thermal shock. Handle is tough, polished plastic. Gas cups have 4 times the impact strength of ordinary cups.

LEAKPROOF

Molded, one-piece water cooling passage has no joints to permit leakage—no water drip to contaminate welds.

EASY, MORE ECONOMICAL MAINTENANCE

Collets, collet bodies, cups and caps are interchangeable with those of your HW-17 Series 2 Torch. All couplings have standard IAA connections, and adaptors are included. Your production costs are lowered, too, for the new HW-18 saves time in hard-to-reach spots. Torch is designed for continuous 300-amp service, a-c or d-c.

ARGON SHUT-OFF VALVE

(Optional) saves time, steps and argon.

For the best in electric welding ...look to LINDE

RAILROAD DEPARTMENT

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The terms "Heliarc," "Linde," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

See and try the new HELIARC HW-18 Torch! Call your LINDE representative today, or write: Railroad Department, LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. In Canada: Linde Company, Division of Union Carbide Canada Limited.

MOA Reports . . .

Maintenance Is the Key

AINTENANCE will largely determine frequency and magnitude of failures to grounds, shorts and opens, the MA Committee on Diesel-Electrical rted in Chicago last month. If pment is kept clean, dry and prop- ventilated, much has been accom- ied. Electricity does not mix with oil water, but locomotives are not built :h do not require these incompatible, necessary, items.

'irt is the biggest problem and the cipal enemy of insulation. If allowed ccumulate, it will also shorten creep- paths, impair the proper working of ing parts, and block ventilation pas- :s. It can be said about cleaning trical equipment, that wiping or blowing with compressed air is just "good hygiene," but if cleaning with a solvent is required, that is "medication." The use of solvents is necessary in the removal of dirt in which oil or grease is present. Precautions must be observed in the use of solvents because some can be dangerous to the user or to the equipment on which the material is being used. Clorinated hydrocarbon solvents will soften and eventually deteriorate varnish insulation.

The Committee suggested some important steps in keeping equipment dry. These include the provision of drains in main generator sumps, and the regular cleaning of these sumps. Conduits should be sealed to prevent the entry of moisture and water. Oil leaks on the engine crankcase should be sealed.

Generators, motors, reversers and braking switches should be cleaned and kept free of oil, water and dirt. Generator and motor string bands and risers should be cleaned and repainted when necessary. Air curing of generator commutators is recommended. Terminal boards and those important connections on resistor and excitation panels should be checked for tightness at periodic inspections. Control jumper cables must be inspected and tested regularly. When in place between units, these jumpers should not be stretched or strained in any way.

Megohmeter and high-potential tests are essential for electrical equipment. Proper records of megger readings are necessary before making Hi-pot tests. Minimum leakage distances and creepage surfaces are common sources for grounds in high-voltage circuits. The best cure is proper cleaning tailored to each specific job.

om the Diesel Maintainer's Note Book

'ould Bill Sparks Have Done Better?

I ENJOYED Gordon Taylor's article in July 1958 issue, (*page 44*) and the ctical use to which Bill Sparks put extension cord. It appears to me t Bill Sparks could well get ac- ainted with his brother, Ned Sparks, o used to work for Walt Wyre in predecessor to *Railway Locomotives d Cars.*

While Bill got the locomotive back to terminal under power, I think if he d been a good electrician rather than run-of-mine diesel maintainer, he uld have connected his wire to ter- nal *GF* and the reverser interlock her than taking energy from the light cuit. This would have given the en- ieer control of the circuit through his ottle the same as he would have under rmal operation. It would kill the nporary connection when the engineer ut his throttle off. I believe you will ree that this connection is superior d quite as easy to accomplish as the nnection listed in the story.

The above criticism is offered as a constructive suggestion and is not in any way intended to belittle the excellent series of articles which all of your readers are enjoying.

C. W. MARTIN
Asst. Engineer-Diesel Electric
Baltimore & Ohio Railroad

Dear Mr. Martin:

This case was written up to outline just what happened rather than as a criticism of the maintainer's method of meeting the situation. It did show ingenuity on the maintainer's part. He got the train moving by a short cut method of tapping the light circuit to get a positive battery connection for the reverser interlocks.

What I tried to stress was the fact that power contactors can only be activated by passage of control current through the *C-D* interlocks *FOR,* or through the *F-E* interlocks of *REV.* Bill Sparks understood that, and took the only means he could think of to quickly remedy the situation.

I thoroughly agree with your suggestion that a much better method would have been to connect the jumper wire to terminal *GF* and the reverser interlock. Your method is the one that I probably would have used, had I been in Bill Sparks place. My narrative would have been improved, had I gone a step further and suggested the better method.

Diesel Notes are written to create interest, and stimulate thinking in the handling of diesel problems. Your letter proves that you think and know how to analyze a situation for the best solution. I wish that all readers would try to find better solutions than those given in Diesel Notes. If readers are caused to think and study their problems, then our Diesel Notes can accomplish their purpose.

GORDON TAYLOR

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

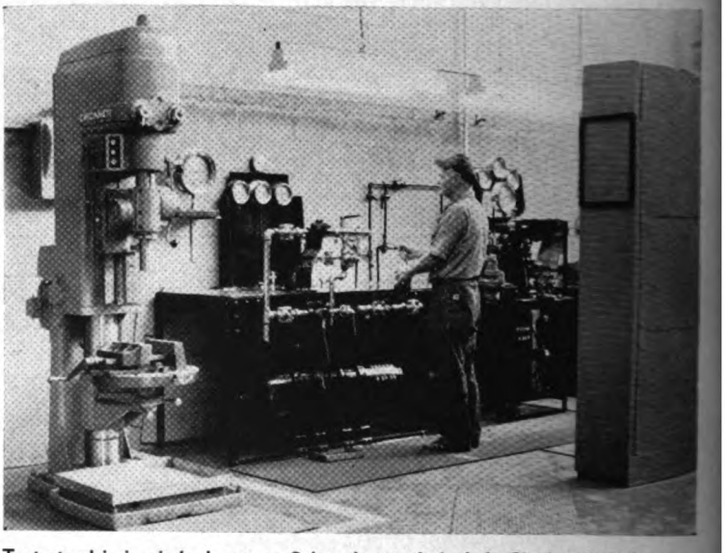
Six inspection tracks on which cars are spotted have pits for the full length of the 444-ft shop. Track at far right is used for truck repairs.

wheels. The monorail extends over the full length of the truck track and to a driveway outside. Back of the drop pit, there is a storeroom and tool lockers, one for each mechanic. Cars are brought in at the east end of the building and these entrances are closed with motor-driven rolling doors.

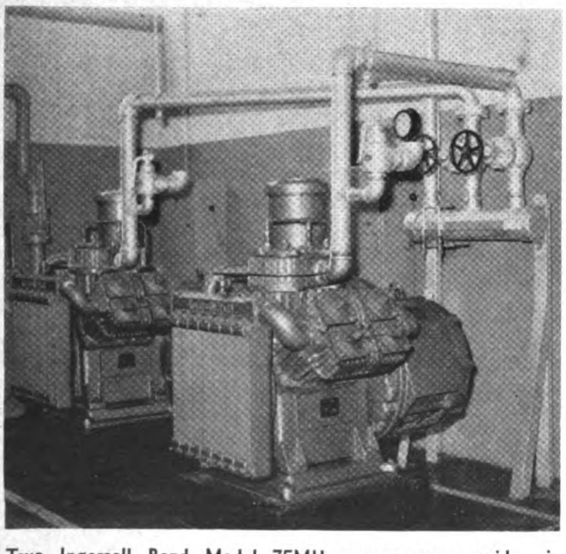
Other shop equipment includes two portable arc welders and two fork lift trucks. The latter serve for inside transport and to carry equipment to either of two outside driveways. There are four stationary battery chargers in the battery room and one portable one.

Shop work includes all regular monthly inspections along with all cars which may have failed on the road. As it works out in practice, 75 per cent of all failed cars are repaired here, and 25 per cent go on to the Morris Park back shop. The m-u shop normally works eight hours with a skeleton shift for night emergency work.

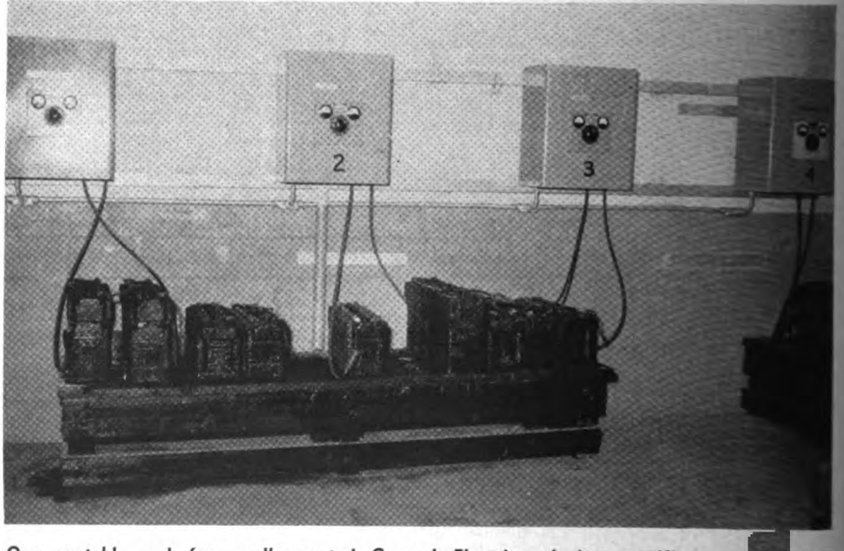
Storeroom at each end of Dunton shop stocks the small parts used in maintenance and repair of over 600 m-u cars.



Test stand is in air brake room. Other shop tools include Cincinnati drill press, two Cincinnati pedestal grinders, and two portable welding machines.

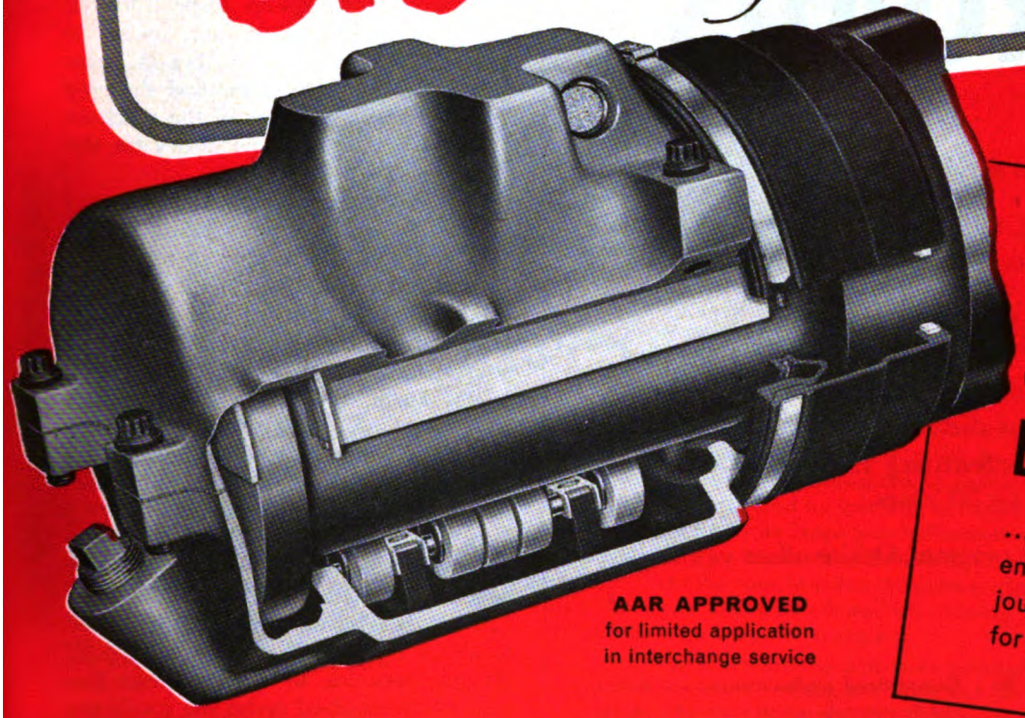


Two Ingersoll Rand Model 75MH compressors provide air for brake tests, portable tools, and for equipment cleaning.



One portable and four wall-mounted General Electric selenium rectifiers are used for charging m-u car batteries at Dunton shop.

INSIDE STORY of the new attack on the HOT BOX PROBLEM



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...new, permanent, soundly engineered and economical journal bearing conversion for freight cars

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In continuing road and laboratory tests, under extremes of actual and simulated operating conditions, Clevite Cartridges are exceeding all performance expectations.

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Oakite is strengthening its service to the railroad industry.

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SP&S Wheel Cleaning

(*Continued from page 23*)

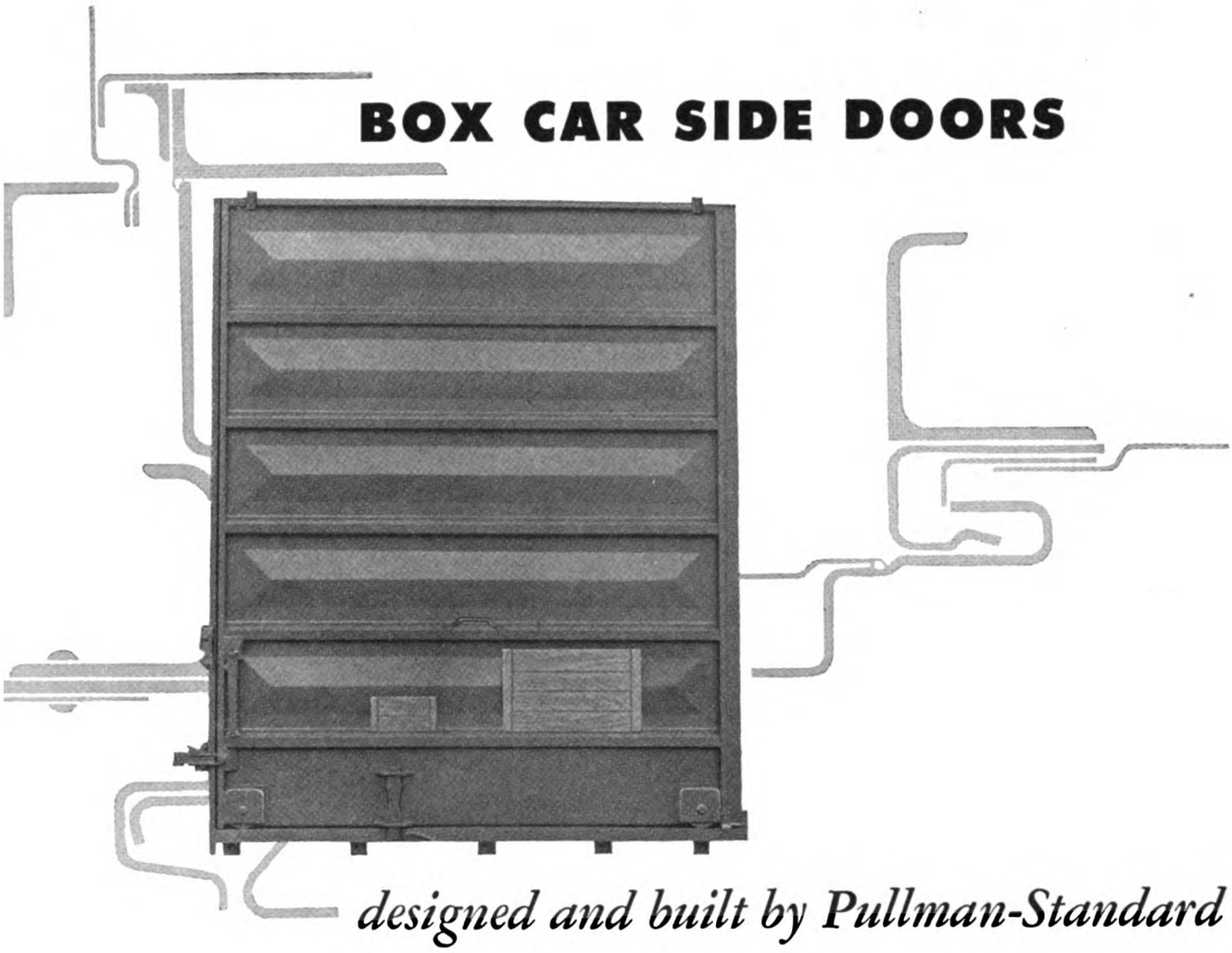
An important part of this machine is the arrangement of spray nozzles, which are made of ¾-in. pipe nipples bent and flattened as required and connected to the 1½-in. supply line with valve control for both the washing and subsequent rinsing. Two different nozzle arrangements are required. To clean the bull gear side of the wheel assembly, one spray is directed at the outside wheel face, one directly over the tread and a third angled so that spray hits the face of the gear, the gear teeth and splashes down between the gear and the wheel. The other wheel is also cleaned by three spray nozzles somewhat more effectively located with respect to the tread and inside wheel face, owing to absence of the gear. A 1½-in. pipe nozzle expanded to 2 in. and directed downward at the center of the machine provides any cleaning necessary for the axle.

The bottom of the machine is water tight and the cleaning solution drains back through a 5-in. pipe to a 600-gal steam-heated rectangular tank set in the ground at the left of the machine. Mounted on the side of the machine housing are the electric-driven solution pump, water and steam supply pipes, and valves. A small water line is installed to prime the pump and a cut-out valve avoids losing this prime between each cleaning cycle.

In operation, about 200 lb of Oakite 24 are placed in the tank of water which is heated to between 200 and 220 deg F. This cleaning solution drops to about 180 deg F as delivered under 40 psi pressure to the nozzles. The wheels are revolved under the scrubbing action of the sprays until thoroughly cleaned. The cleaning solution is then turned off and clear hot water and steam supplied to the same nozzles for rinsing. Within a few minutes after removal of the wheels from the machine they are dry. Every surface can be inspected with assurance that potential cracks or other defects are well cleaned out for easy observation.

Dirty residue from the cleaning solution settles both in the base of the machine which has to be cleaned out about every 60 to 90 days, and in the bottom of the solution tank which accumulated about 6 in. in 8 months before cleaning was necessary. The effective life of the Oakite cleaning solution depends on the number of wheels cleaned. At the SP&S shop, this generally varies between one and two months.

BOX CAR SIDE DOORS



designed and built by Pullman-Standard

- **Design: by the world's largest car-builder . . . with fifteen years' experience in door manufacturing.**
- **Size: 9′ 11″ or specified height. 6′-7′-8′-9′ or specified width.**
- **Complete with fixtures and sub-parts, all to P-S design.**
- **Panels of .10-inch corrosion-resistant copper bearing steel. Lock, starter and bumper of cast steel. All parts weldable.**
- **Extra-heavy (5/32-inch) bottom member.**
- **5″ rollers in door roller assembly insure easy operation.**
- **Precision fabricated, embossed for strength, assembled by arc-welding.**
- **All around sealing arrangement excludes dirt and weather, safeguards lading.**
- **Self-protecting design and fabrication excellence mean long life, easy maintenance.**

Pullman-Standard has designed, built and laboratory and service tested a new box car side door, with integral fixtures, to fill the needs and specifications of the railroad industry. Offering maximum lading protection from dirt and weather, this new door is sealed all around by specially designed interlocking contours. The unit rolls smoothly and easily on large 5-inch diameter rollers with hardened roller bearings. The safety latch and door lock work as a unit. And the safety latch automatically locks the door in either the open or closed position after one car impact. The entire door and fixture unit is made for lasting service, durability and rugged strength.

After extensive field research to determine railroad and shipper requirements, prototypes of this door were designed, built and put into continuous laboratory and in-service tests more than three years ago. Every possible test was applied time and time again. The P-S Door withstood every abuse. Example: over 75,000 severe individual roller and bearing impacts were test-applied to prove the door roller assembly.

Confirming "on the job" acceptance of this new unit by America's railroads are the more than 2500 car sets now in service or on order by 12 major users.

Replacement parts will be kept on hand by Pullman-Standard, and railroad orders will be filled immediately from inventory.

For full information on the new P-S Box Car Side Door, and how it can be applied to PS-1 Box Cars now on order, write for literature or contact the nearest Pullman-Standard sales office.

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY
SUBSIDIARY OF PULLMAN INCORPORATED
200 SOUTH MICHIGAN AVENUE, CHICAGO 4, ILLINOIS
BIRMINGHAM, PITTSBURGH, NEW YORK

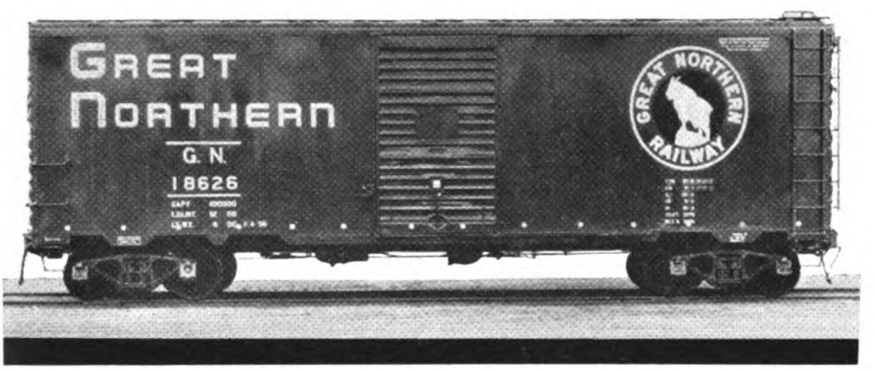
For Restoring B and C Floors

GREAT NORTHERN

is using time-proven

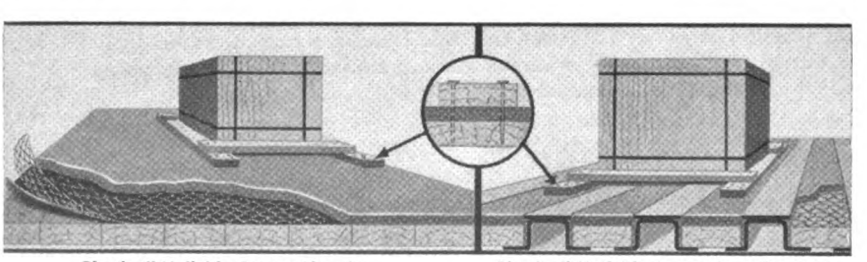
Plastinail*

Nailable Cement Flooring



REPORTS THE GREAT NORTHERN: *"We made our first tests with Plastinail back in 1949. Since that time we have Plastinailed several hundred cars with very satisfactory results."*

Do you have the Plastinail story? Applied to a sound B or C floor, it will provide 7 or 8 years or more of Class A service. And it's a better floor — smooth, inorganic, non-absorptive, easily prepared, nailable. Yet, Plastinail costs less than a new wood floor. The first cost is less. And the service is supreme because wood and Plastinail is 79% stronger than wood alone.



Plastinail Nailable Cement Floor in standard box car

Plastinail Nailable Cement in conjunction with steel as an original floor

F. E. SCHUNDLER & COMPANY, INC.
504 Railroad St. Joliet, Illinois

Reading's Flange Lubrication

(*Continued from page 26*)

contributing to curve wear and surface defects. With so many variables, it is impossible to accurately predict conditions or recommend procedures to reduce costly rail replacements.

It is impractical to conclude that lubrication between the wheel flange and the gage side of the high rail of a curve will eliminate curve-worn rail. A method of lubrication is desirable, but should not impair wheel-to-rail adhesion on the running surface of the rail.

When molybdenum disulfide, incorporated in a solid lubricating stick, was applied to Reading locomotive wheel flanges, the following were the test results: (1) There was an average reduction of 35 per cent in rail wear rate at curves per 1,000,000 gross tons of traffic; (2) rail wear is doubled in cold weather, but molybdenum disulfide is effective over a wide range of temperatures and is unaffected by low temperatures; and (3) after one year of application from all trains over the test area, residual molybdenum disulfide on wheel flanges reduced rail wear with greater effectiveness than when used initially.

The Catawissa grade, used for adhesion and curve-worn rail tests, has approximately 47,000 ft of curved rail, 4 deg or sharper. On the basis of 1.80 cents per ft per million tons of traffic, and approximately 12 million tons of traffic annually, the total cost is $10,152 per year for curve worn rail on a 35-mile grade. The annual saving in curve-worn rail is approximately $3,550 on the Catawissa grade, or a cost in curve-worn rail of 1.37 cents per ft per million tons of traffic in lieu of 1.80 cents.

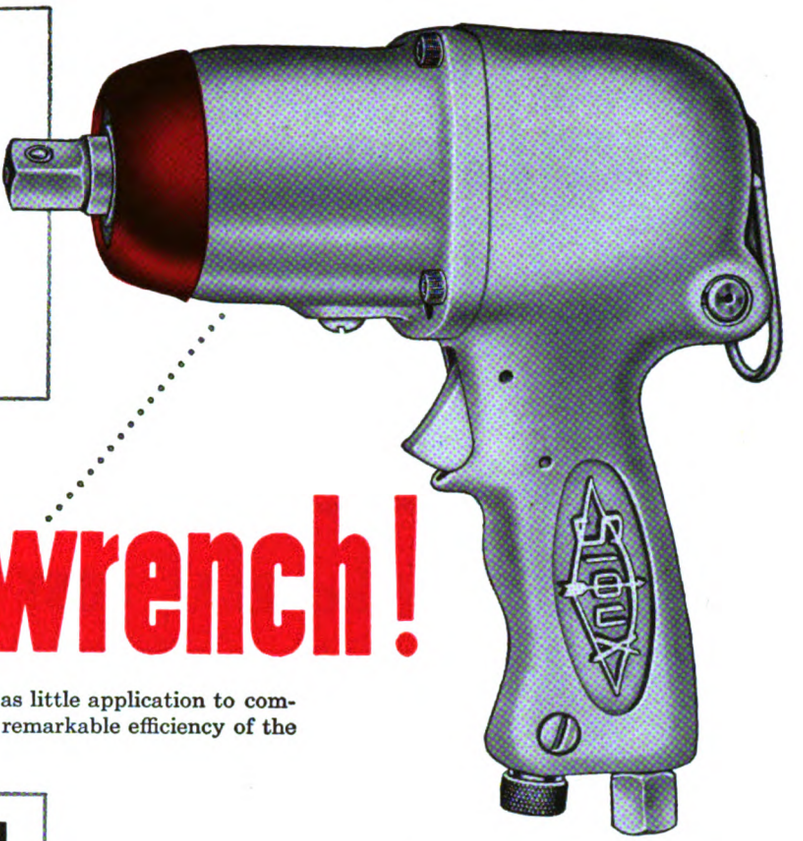
The "Moly" flange sticks averaged 2,092 miles per stick, with 4 sticks per unit. Cost for the "Moly" sticks for one year of lubrication is approximately $1,250, a net annual saving of $2,300 on the Catawissa grade only. The estimated cost to apply four flange lubricators is $111.75 per unit, for 31 units, is approximately $3,500. Therefore, the return on the investment is approximately 65 per cent.

Because the units equipped are pooled in services beyond the Catawissa grade, the savings are cumulative on all curves where these units operate. Stick life is based on this pooled service, and was calculated from speed recorder mileages when sticks were replaced. An additional major saving with flange lubricators should be in locomotive wheel wear and the Reading is to report on this in the future.

15% more torque from the same air pressure while consuming 30% less air! *It's the new*

SIOUX

Air impact wrench!



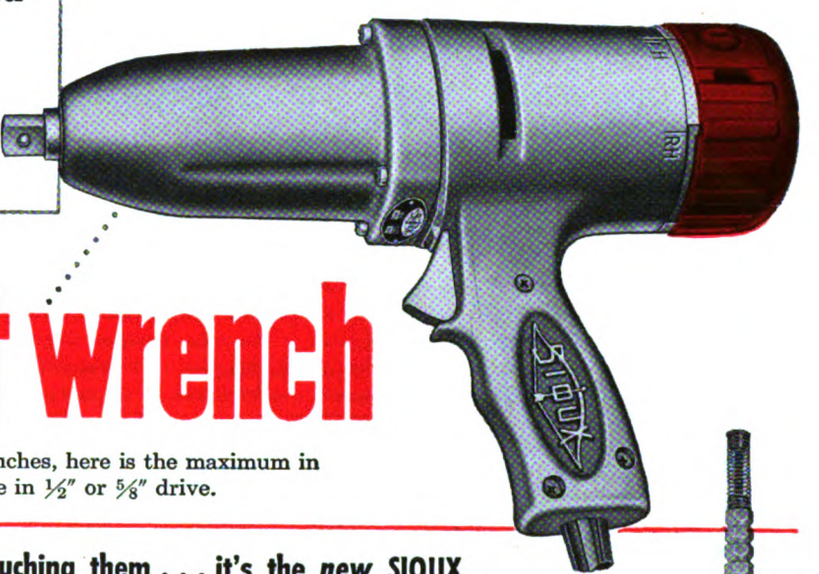
"Free as the air" is an expression which has little application to compressed air. Learn more about the truly remarkable efficiency of the new Sioux Air Impact Wrench.

Unexcelled Performance and Durability....

It's the

SIOUX

Electric impact wrench



When it comes to electric impact wrenches, here is the maximum in dependable power per dollar. Available in ½" or ⅝" drive.

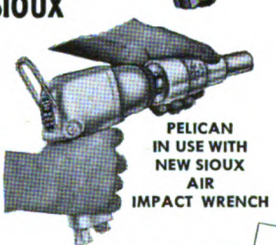
PELICAN

Spin nuts on or off without touching them . . . it's the *new* SIOUX

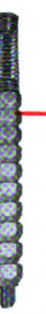
"Pelican" NUT ACCUMULATOR

Action of the impact wrench removes nuts and spins them up into the Pelican on a center stem. The stem will hold ten ¾" or 13/16" hex nuts, either 7/16" or ½" thread. Reverse action spins the nuts back on. Stems can be removed with their load of nuts and empty stems installed in their place. Or, stems can be pre-loaded and placed in Pelican for assembly operations.

The Pelican may be used with any ½" or ⅝" square drive, air or electric impact wrench.



PELICAN IN USE WITH NEW SIOUX AIR IMPACT WRENCH



LOADED CENTER STEM

LOOK UNDER "TOOLS—ELECTRIC"

WRITE FOR THE NEW CATALOG

SIOUX

ALBERTSON & CO., INC.

SIOUX CITY, IOWA, U.S.A.

NEW AIR IMPACT WRENCHES • NEW AIR SCREWDRIVERS • NEW "PELICAN" NUT ACCUMULATORS • ELECTRIC IMPACT WRENCHES • DRILLS • GRINDERS • SANDERS • POLISHERS • SCREWDRIVERS • PORTABLE SAWS • VALVE FACE GRINDING MACHINES • FLEXIBLE SHAFTS • ABRASIVE DISCS

The REAL COST depends on RESULTS!

Because of their efficiency and speed

LIX DIESEL CLEANERS

are MOST ECONOMICAL in the end!

Fast, efficient, economical maintenance is a must for the modern railroad. Developed through years of experience in the railroad cleaning field, LIX Diesel Cleaners meet this need perfectly.

With LIX, **no scraping or brushing** is necessary . . grit, grime and caked carbon are **soaked away**—with speed and thoroughness unequaled in any other cleaner. Even hard-to-clean **LUBE OIL COOLERS** can be thoroughly cleaned with Lix. Lix Cleaners are **harmless** to all metals . . and all metals can be cleaned in the same tank at the same time. Lix Cleaners leave no granular deposits . . reduce after-rusting. They're **safer,** too (low in toxicity, not a fire hazard.) And because they have **longer life** without frequent charges, they're **more economical** in the end than "less expensive" cleaners!

The Lix line also includes evaporative type cleaners for **spray** use.

PROVE TO YOURSELF how you can SAVE TIME and CUT COSTS on periodic surface cleaning of locomotives and on overall cleaning of diesel parts . . . write or phone for a LIX DEMONSTRATION in your shop, without cost or obligation!

THE Lix CORPORATION
PRODUCTS OF RESEARCH
(OF MISSOURI)
300 WEST 80TH • DEPT. RL-10
KANSAS CITY, MISSOURI
"Leadership in Industrial Cleaning"

1

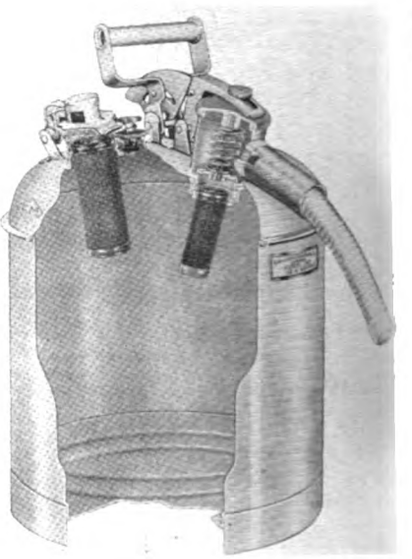
What's New

(*Continued from page 12*)

a small lever within easy reach of the thumb.

The 5081T tool runs at a free speed of 1,350 rpm, and will deliver 2,000 impacts per min at 90 psi air pressure. It weighs 9½ lb.

The 5081 tool without torque control runs at a free speed of 2,000 rpm and, when impacting, also delivers 2,000 impacts per min. at 90 psi air pressure. It weighs 8⅝ lb. The square driver measures ⅝ in. across flats. *Ingersoll-Rand Company, Dept. RLC, 11 Broadway, New York 4.*



Safety Can

This "type 2" industrial filler-dispenser safety can, for use wherever flammable liquids are handled, is approved by Underwriters Laboratories, Inc., and Factory Mutual for handling or storing gasoline, oil, or similar liquids. It is made of 24-page terne-coated steel, and the body and breast are each "seamless drawn" from one-piece steel and welded together. Construction is further strengthened by a heavy 16-gage steel hoop on the bottom of the can.

A combination "free-swing" carry-operating handle is designed for ease in using the can. To open, engage the handle in gear groove of connecting arm and press down. A flexible metal spout permits pouring or dispensing flammable liquids into small openings without spilling. The pouring spout and filler opening have double metal wire mesh fire baffles or screens for complete fire protection. There is a positive-acting valve at the base of the flexible spout. The can comes in 2½- and 5-gal sizes. *Eagle Manufacturing Company, Dept. RLC, Wellsburg, W. Va.*

Armature Coils

An armature coil with moisture resistant loop-ends and adjacent coil legs has been designed for longer life under adverse operating con-

(*Continued on page 60*)

With Baldwin conversion kits, you can modernize your VO engines at low cost

Modernized Baldwin VO locomotives are now operating on the Southern Pacific and on many other lines.

Maintenance and operating costs of your Baldwin VO units can be substantially reduced and their performance so improved that they will match that of the 600 Series engine. This is made possible by the application of new design parts now available in modernization kits for both 6- and 8-cylinder engines. These parts can be applied in your own shops.

Among many other advantages of modernizing your VO locomotive engine the Baldwin way are (1) fuel savings of more than 15%; and (2) substantial savings in cylinder head replacement.

The Baldwin conversion kits are the product of long and extensive research, and before their introduction they were subjected to field tests of the most exhaustive nature. For detailed information on a program that can save your road many thousands of dollars, write for a copy of our new Bulletin 2010.

Major features of conversion this Baldwin way

- New cylinder head with central injection can be directly applied to existing Model VO "A" frame; original bolting arrangement is retained
- Cylinder head is machined to accommodate the same valve gear and the same intake and exhaust valves used on Model 600 engines
- Pistons are identical with those on Model 600 engine
- A 1-piece, lightweight cylinder head cover is provided; also CC size fuel injection pumps designed to retain the original camshaft; fuel injectors with top inlet connection
- Larger fuel pump and pushrod rollers are provided

BALDWIN · LIMA · HAMILTON
Eddystone Division
Philadelphia 42, Pa.
Hydraulic turbines • Weldments • Dump cars • Nonferrous castings • Special machinery • Bending rolls • Machine tools

ditions. The new GE-752 armature coil has a forged lead paddle, resulting in tighter construction and a reduction in coil movement and vibration. During the forging operation, the entire length of the lead paddle is cold worked, resulting in a hard copper paddle which is resistant to metal fatigue. According to GE engineers, fatigue life is improved by as much as 17 to 1 over soft copper where high frequency vibrations are present.

Grounds, short circuits, and copper breakage have been minimized through the use of a very tight armature coil loop. Orphan type construction is used, allowing split coil operation without the necessity of making brazed connections between coils.

Additional insulation is applied to the corners of the coils, overlapping the ground insulation and continuing around the head of the coil leg. This added insulation not only seals the ends of the ground insulation, but also provides increased creepage distance. Additional loop reinforcing insulation is used. It consists of three quarter lapped silicone glass-backed mica tape covering the entire loop and extending well up the coil legs. Both conductor and ground insulation are full Class H. Outside tape consists of pre-treated glass tape to which varnish is applied under vacuum pressure. Straight portions of the coil are dipped in Permafil varnish and hot molded. Micamat ground insulation assures correct core slot fit regardless of time in storage prior to winding. Each new coil is tested to six times its maximum operating voltage. *General Electric Company, Dept. RLC, Schenectady, 5, N.Y.*

Supply Trade Notes

(*Continued from page 7*)

vice-president, appointed president, succeeding *Harry J. Leddy*, retired.

Mr. Bootes joined ACF in 1947 in a sales capacity, became sales vice-president in 1949, vice-president in charge of marketing in 1955, and executive vice-president in February of this year.

■

ALBERT MANUFACTURING COMPANY. —*Robert E. Coughlan* appointed director of sales for new Albert lubricator pad and seals, which will be handled through the *Marquette Railway Supply Company* of Chicago. Mr. Coughlan was formerly associated with the Miller Lubricator Company.

■

GENERAL AMERICAN TRANSPORTATION CORPORATION; FREUHAUF TRAILER COMPANY.—An agreement between General American and Freuhauf gives Freuhauf the exclusive license to build and sell trailers and multi-purpose containers specifically designed for transport on General American Clejan piggy-back cars. Freuhauf will develop and promote a uniform type of container suitable for freight shipments on all forms of transportation. It will also build trailers.

■

DUFF-NORTON COMPANY.—*Edward H. Hodgson,* manager of sales promotion and marketing, appointed sales manager, Worm Gear Jack Division.

■

INSTITUTE OF THREAD MACHINERS, INC.—Address of Institute now P. O. Box 483, Greenwich, Conn.

■

ELECTRIC STORAGE BATTERY COMPANY.—*James G. Bouska,* assistant branch sales manager in San Francisco, appointed sales manager of Los Angeles branch of Exide Industrial Division, succeeding *Robert J. Muth* transferred to Philadelphia as field sales manager.

Boston branch of Exide Industrial Division moved from 100 Ashford street to a new building at 315 Mystic avenue, Medford, Mass.

■

ENTERPRISE RAILWAY EQUIPMENT COMPANY. — *Clarence J. Koranda,* sales engineer, appointed assistant to vice-president, sales.

■

STRATOFLEX, INC.—*C. A. Thomas,* vice-president of sales, named president and *John Tullis,* vice-president and general manager. *Ben Matheson,* New York representative, appointed sales manager.

■

NATIONAL FORGE COMPANY.—*National Forge & Ordnance Co.,* Irvine, Pa., has changed name to National Forge Company.

■

PULLMAN-STANDARD CAR MANUFACTURING CO.—*Frank L. Murphy,* assistant sales vice-president, Washington, D. C., appointed assistant vice-president in charge of railroad lading protection products' sales and service, with headquarters at Chicago.

■

K-W BATTERY COMPANY. — *Southland Battery Company* appointed exclusive sales representative in Texas and Oklahoma.

Robert G. Burson
Dayton Rubber

Arthur H. Morey
General Electric

DAYTON RUBBER COMPANY.—*Robert G. Burson* appointed general sales manager of Mechanical Goods Division, succeeding *Leonard C. Strobeck,* retired vice-president in charge of mechanical goods sales. Mr. Strobeck will establish offices in Dallas, Tex., where he will continue special staff and sales development work for Dayton Rubber. *Moffatt Sherard* and *Josh Montgomery* appointed sales engineers, Industrial Division, at Columbia, S. C., and Greensboro, N.C., respectively.

■

GENERAL ELECTRIC COMPANY.—*Arthur H. Morey,* manager of railroad Locomotive Advance Engineering Unit, will receive the George R. Henderson Medal from the Franklin Institute on October 15 for "his engineering contributions to, and his effective leadership in, the overall design, development and service testing of the successful 4500-hp General Electric Company gas turbine-electric locomotives. . . " The locomotive, first developed after the Second World War (1946-1953), now has progressed to an 8500-hp locomotive.

■

ALCO PRODUCTS, INC.—*Robert W. Pittman* appointed sales manager for transportation products and services. *Robert H. Binkerd* named sales manager, industrial equipment, spring and forge division.

■

BALDWIN-LIMA-HAMILTON CORPORATION.—Cleveland office consolidated with Pittsburgh office at 1098 Union Trust building, Pittsburgh 19. HAMILTON DIVISION.— *E. L. Essley Machinery Company,* 565 West Washington Blvd., Chicago, appointed mid-central area sales representative for Niles industrial and railroad machine tools.

■

FINE ORGANICS, INC.—*Raymond P. Wassell* of Chattanooga, Tenn., appointed Tennessee agent.

■

BUDD COMPANY.—*Griscom Bettle, Jr.,* appointed sales representative, Disc Brake section, Railway Division. Mr. Bettle formerly a Railway Division sales representative.

Obituary

RICHARD C. WINKLER, vice-president and director, W. H. Miner, Inc., Chicago, died September 1.

■

JOHN D. COLEMAN, 44, sales representative for diesel locomotive rebuild services at the Alco Products, Inc., plant, Schenectady, N. Y., died suddenly August 22 while at work.

■

C. E. KINNAW, sales and service representative, Northwestern territory, Hennessy Lubricator Company, died August 25 in Santa Ana, Cal.

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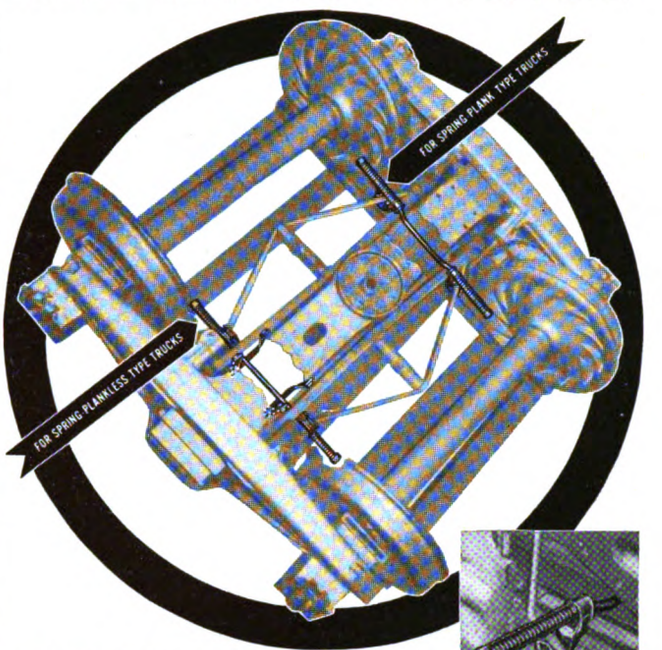

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9. Brake beams, rods, and levers are held in position under spring tension thus reducing false movements, chattering and wear of hangers, hanger pins and brake heads.
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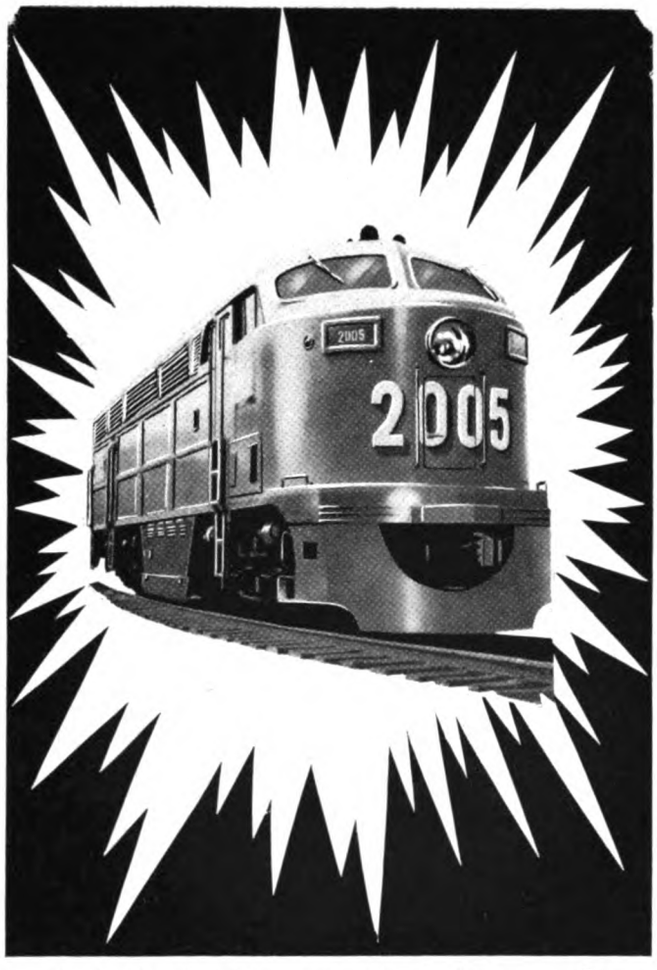

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Baldwin-Lima-Hamilton Corporation, Hamilton Division 47
The Buckeye Steel Casting Co. 17

Demp-Nock Company 61

Electro-Motive Division, General Motors Corporation 8, 9
Esso Standard Oil Co. 20
Ex-Cell-O Corporation 49

Gulf Oil Corporation 44, 45
Grip Nut Company 61

Huck Manufacturing Company 16

International Nickel Company 14

Journal Box Servicing Corporation 41

Linde Company, a Division of Union Carbide Corporation 56
Lix Corporation 56
L. O. F. Glass Fibers Co. 15

Magnus Chemical Co. 62
Magnus Metal Corporation 38, 39
W. H. Miner, Inc. ..... Inside Front Cover
Morton Manufacturing Company 42

National Carbon Company, Div. of Union Carbide Corp. 33
National Electric Coil Company 3
National Malleable & Steel Casting Co. ..... Inside Back Cover
Oakite Products Co. 54

Pullman-Standard Car Mfg. Co. 55

Schundler & Co., Inc., F. E. 56
Speer Carbon Co. 14
Sperry Rail Service, Division of Sperry Products, Inc. 18
Standard Car Truck (Clevite Div.) 53
Standard Car Truck Company 6
Standard Oil of California 13
Sturtevant, P. A. 60
Stucki Company, A. 61

Timken Roller Bearing Co. ..... Back Cover
Toledo Pipe Threading Machine Co. 16

Union Carbide Corporation, Linde Company Division 5
Union Carbide Corporation, National Carbon Company 33

Waukesha Motor Company 4
Wine Railway Appliance Co. 34, 35

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Lock No. E40

Knuckle Pivot Pin No. C10

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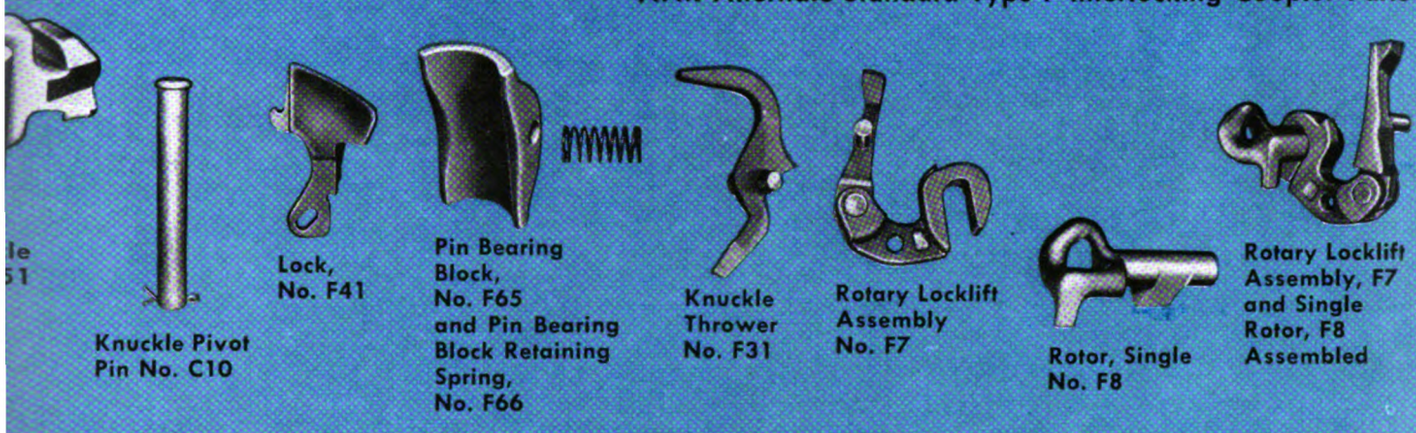

le
51

Knuckle Pivot Pin No. C10

Lock, No. F41

Pin Bearing Block, No. F65 and Pin Bearing Block Retaining Spring, No. F66

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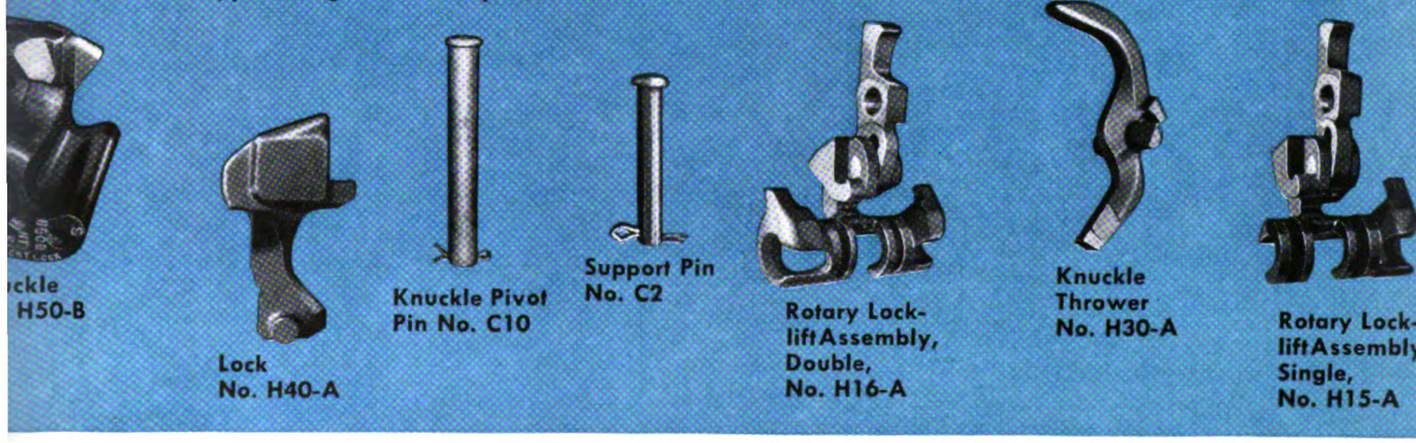

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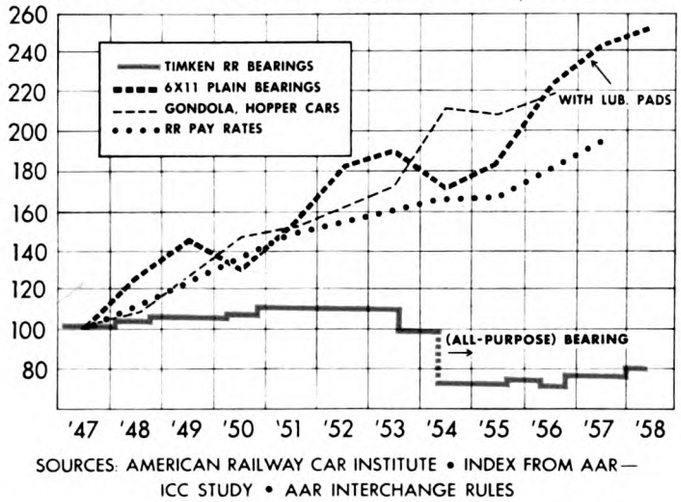
A plan to save the railroads $288,000,000 a year can START RIGHT NOW!

1 PLANNED PROGRAM WILL MAKE "ROLLER FREIGHT" EVEN MORE PRACTICAL—When all freight cars roll on roller bearings America's railroads will save an estimated $288,000,000 a year*—or $144 per car. Here's one way the railroads can start working toward that goal right now—with a planned program for equipping all cars with roller bearings.

Every railroad might agree to put a certain number of cars on roller bearings every year. It would speed the day when all freight is "Roller Freight"—when the biggest savings can be realized. The railroads would get greater immediate benefits because they'd get back about as many cars as they put into interchange. And a planned program would help the railroads set economical shop schedules to reduce the cost of converting existing rolling stock. It would enable us to *plan* roller bearing production—automatically keeping the cost at a minimum.

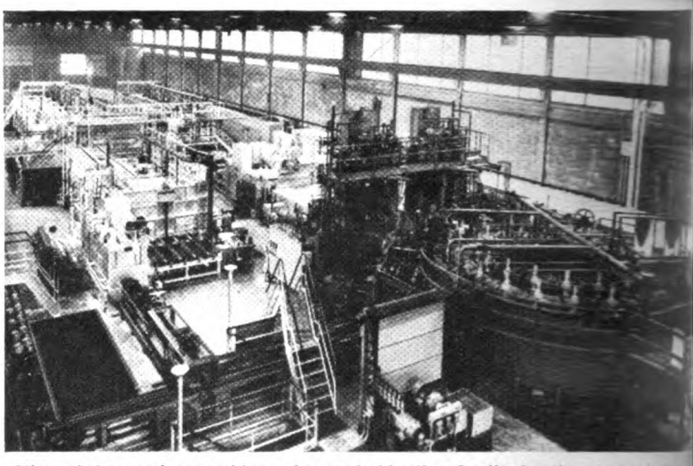
TIMKEN BEARING COSTS HAVE STAYED DOWN WHILE OTHER RAILROAD COSTS HAVE SKYROCKETED (INDEX 1947 = 100)



SOURCES: AMERICAN RAILWAY CAR INSTITUTE • INDEX FROM AAR—ICC STUDY • AAR INTERCHANGE RULES

2 $7,000,000 PLANT WILL KEEP COST OF GOING "ROLLER FREIGHT" DOWN—Our new Columbus, Ohio, plant (see photo) uses revolutionary production methods to produce up to 20,000 car sets a year—keep bearing costs down.

This unique plant is designed for a planned "Roller Freight" program . . . to make "Roller Freight" an even better buy. Right now the extra cost of equipping a freight car with Timken® roller bearings is almost 50% less than it was only 10 years ago. Meanwhile, the cost of friction bearings and other railroad purchases has been climbing (see chart). The price gap between Timken roller bearings and friction bearings has been greatly narrowed and use of this plant can help close this gap even more.



View of ultra-modern machinery that can hold railroad roller bearing costs down.

3 IMPROVED FREIGHT CARS WILL GET THE RAILROADS MORE BUSINESS—With more "Roller Freight" cars, you'll be able to get more business by *guaranteeing* faster, more dependable shipping. Timken tapered roller bearings end the No. 1 cause of freight train delays—the hot box problem. One railroad's cars on Timken bearings have rolled over 300,000,000 car-miles with only one over-heated bearing. That's because Timken bearings *roll* the load, don't slide it. Each car on Timken bearings means eight fewer potential hot boxes to worry about. And they cut terminal bearing inspection time. Each car on Timken "AP" bearings produced in our new plant will go at least three years without adding lubricant.

Already 69 railroads and other freight car owners have over 25,800 cars on Timken bearings—⅔ of them in interchange. Why not talk to other railroaders about planned conversion of existing rolling stock and equipping of new cars with roller bearings? Why not make use of your new railroad roller bearing plant? The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

*1958 revision of estimated total annual savings from an Economic Study of "Roller Freight" made by The Timken Roller Bearing Company. The study combines statistics furnished by the Association of American Railroads, the Interstate Commerce Commission, the University of Illinois and individual railroads.

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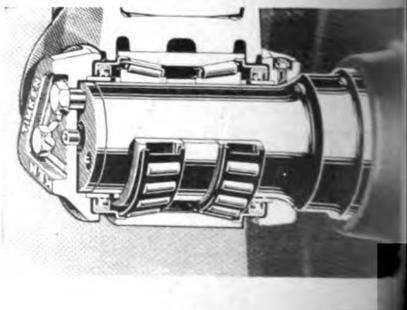

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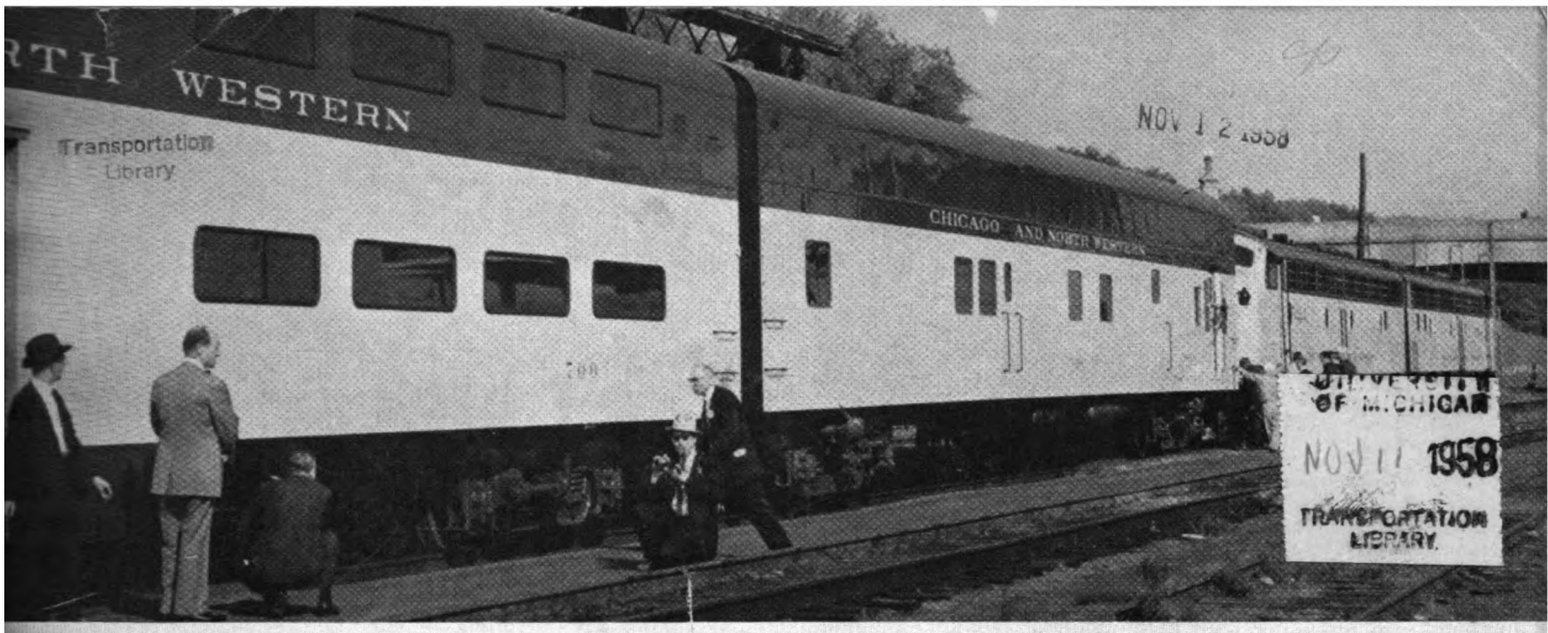

C&NW Bi-Level Mainliners Go Into Service . . . . . Page 32

AILWAY

LOCOMOTIVES AND CARS

A SIMMONS-BOARDMAN **TIME-SAVER** PUBLICATION **NOVEMBER 1958**

Union Tank Builds Unique Car Shop . . . . . Page 25

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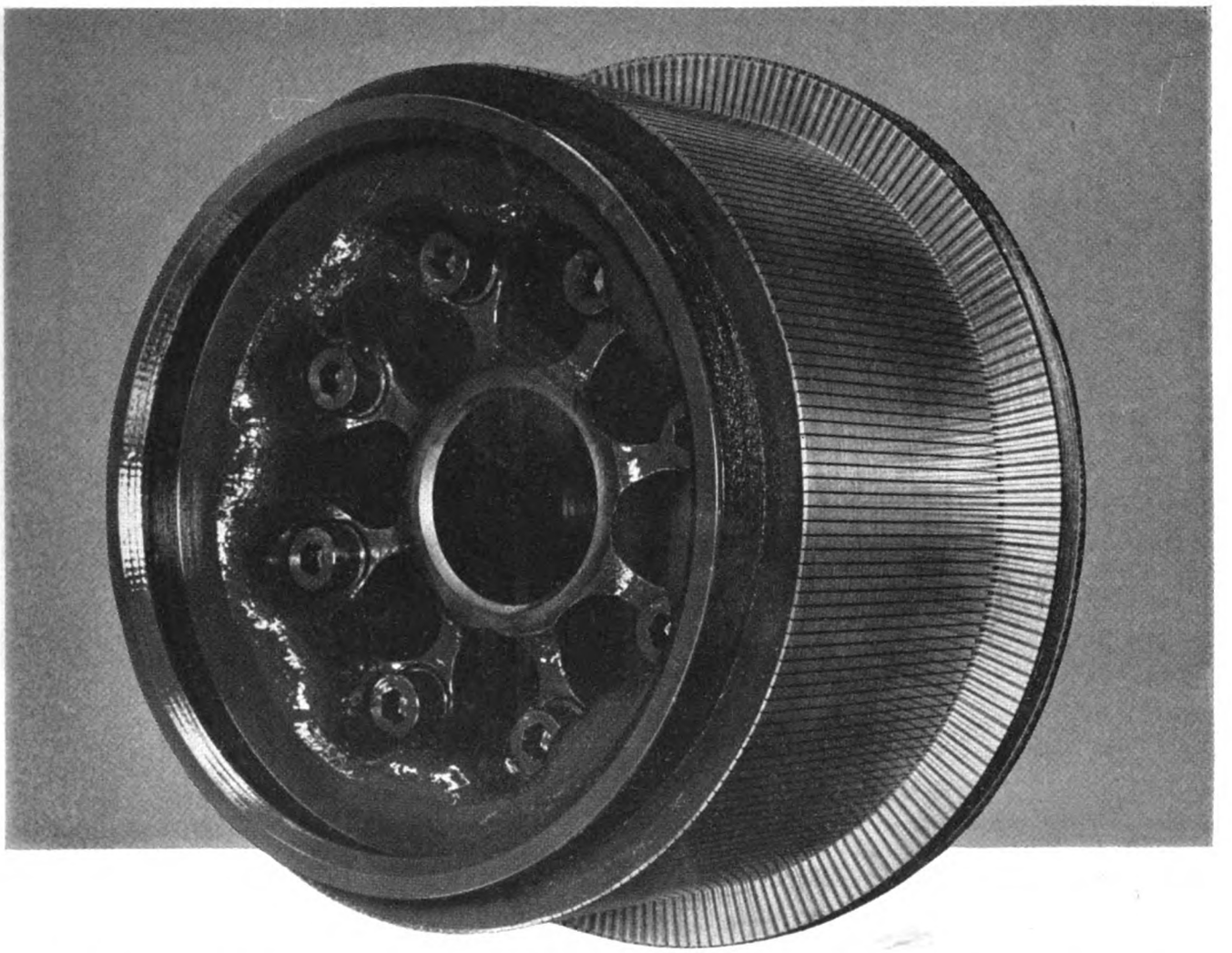

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REPORT FOR NOVEMBER

Exhibits Scheduled for 1959 Mechanical Convention

The annual meeting of the Allied Railway Supply Association on September 17, 1958, voted to hold an exhibit September 20-23, 1959, at the Hotel Sherman, Chicago. This exhibit will be held in conjunction with the annual meetings of the Air Brake, Car Department Officers, Locomotive Maintenance Officers, and Railway Fuel and Operating Officers Associations. The Sherman will have more exhibit space available in 1959. The Allied Railway Supply Association is also investigating the possibility of having a track exhibit in addition to the exhibit at the hotel; it has been determined that such an exhibit is feasible.

The outgoing president, C. R. Busch (Unit Truck Corp.) presided at the meeting. New officers elected for 1958-59 are: president, G. L. Green (Pullman-Standard Car Mfg. Co.); first vice-president, H. C. Hallberg (Waugh Equipment Co.); second vice-president, D. I. Packard (Brandon Equipment Co.); third vice-president, C. E. Grigsby (American Steel Foundries); treasurer, J. G. Rees (Westinghouse Air Brake Co.); secretary, A. R. Nelson (W. H. Miner, Inc.). J. D. Ristine continues as executive secretary.

Filter Design Improved By Radioactive Analysis

Such information as interior flow rates and adsorption areas, which contributes to positive air-brake operation, is being obtained on the Vapolex filter manufactured by the Air Brake Division of the Westinghouse Air Brake Company through the use of radioactive tracers developed by the Nuclear Science & Engineering Corp., Pittsburgh.

Unless filtered, the oil picked up from the compressor on a locomotive and carried along with the air passing into the brake system accumulates as a varnish-like deposit on valves and hinders air-brake operation. Because this oil passage is in vapor form, prior methods of measuring its volume were not positive. By introducing a radioactive isotope into the compressor crankcase oil, Nuclear Science can meter and chart the degree of radioactivity present at critical points in the air system and thus determine filter efficiency, permissible degree of saturation, and service interval for replacement of filter element.

High-Horsepower Locomotives Are Under Test

General Motor's new high-horsepower SD-24 locomotive being demonstrated on the Duluth, Missabe & Iron Range is, essentially, an SD-9 with a turbosupercharger which boosts horsepower to 2,400. It has all-electric controls, including a new 16-stage transition.

The first of the 8,500-hp General Electric gas turbine-electrics is in experimental service on the Union Pacific, handling freight runs between Omaha and Ogden. The UP has 30 of the units on order. At the same time, the UP has been testing a 9,900-hp. gas turbine-electric locomotive produced by coupling two of its older 4,500-hp units in multiple. Fuel is being carried on a tender between the two units.

(Turn to page 10)

TIME SAVING IDEAS FOR NOVEMBER

MOTIVE POWERS AND CAR

Union Tank Builds Circular Car Shop 25
More Accurate Calibration for Fuel Injectors? 28
To Keep Your Covered Hopper Clean 29
C&NW Coaches 32
Frosty But Not Freezing 33
SP Power Brake Adjuster 34
Southern Pacific Upgrades Box Cars with Plywood 36
"Centralized" Reclamation 40
GN Solves Its Winter Coach Repair Problems 48

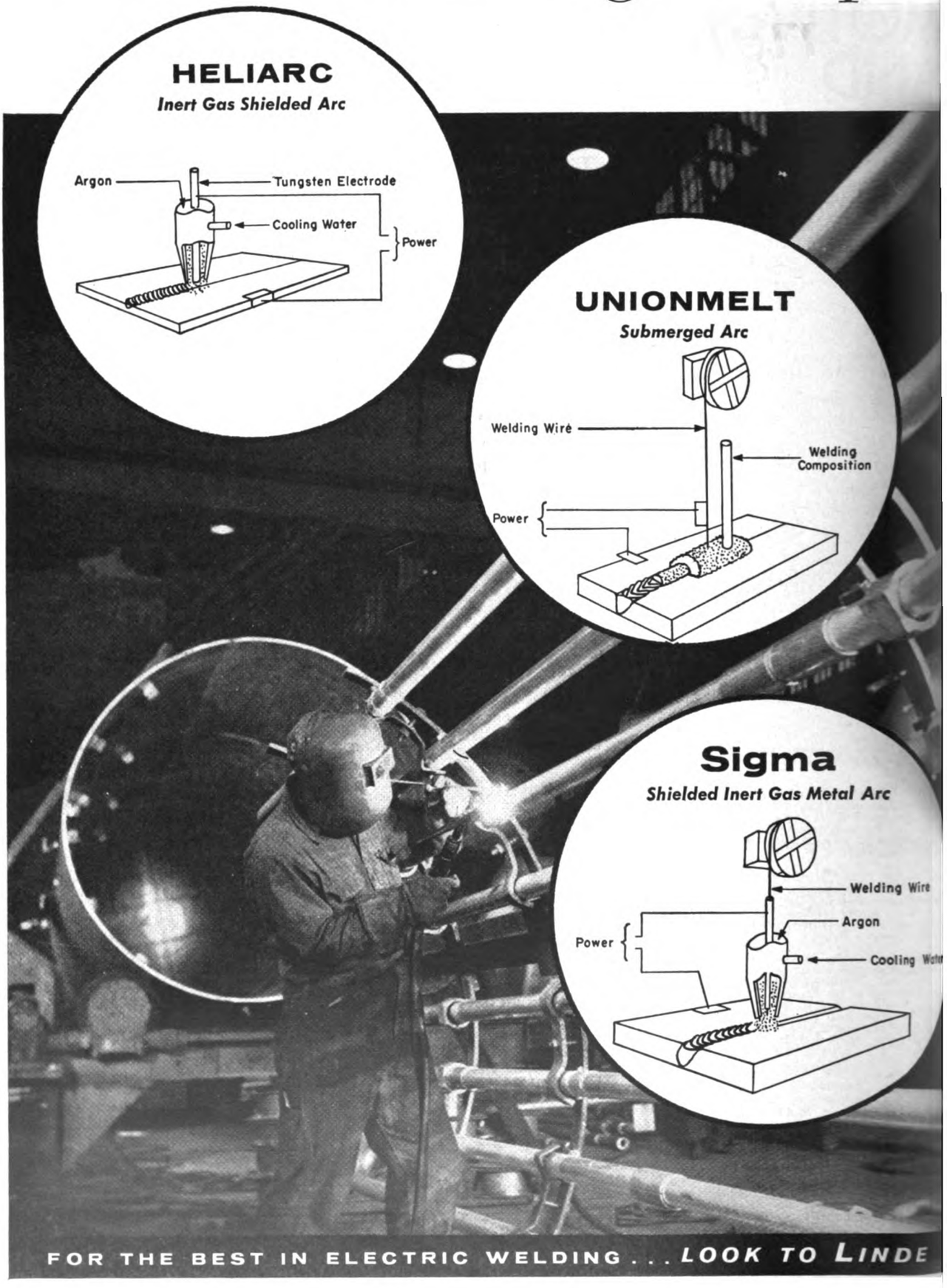
ELECTRICAL

Roll Them Out Like New—Armature Stripping 50
They Didn't Double Cross This Diesel 56

DEPARTMENTS

Report 5
Personal Mention 10
Supply Trade Notes 10
What's New in Equipment 12
Questions and Answers 52
Helps from Manufacturers 68

From Car Building to Repai



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., BRISTOL, CONN.

REPORT FOR NOVEMBER

Exhibits Scheduled for 1959 Mechanical Convention

The annual meeting of the Allied Railway Supply Association on September 17, 1958, voted to hold an exhibit September 20-23, 1959, at the Hotel Sherman, Chicago. This exhibit will be held in conjunction with the annual meetings of the Air Brake, Car Department Officers, Locomotive Maintenance Officers, and Railway Fuel and Operating Officers Associations. The Sherman will have more exhibit space available in 1959. The Allied Railway Supply Association is also investigating the possibility of having a track exhibit in addition to the exhibit at the hotel; it has been determined that such an exhibit is feasible.

The outgoing president, C. R. Busch (Unit Truck Corp.) presided at the meeting. New officers elected for 1958-59 are: president, G. L. Green (Pullman-Standard Car Mfg. Co.); first vice-president, H. C. Hallberg (Waugh Equipment Co.); second vice-president, D. I. Packard (Brandon Equipment Co.); third vice-president, C. E. Grigsby (American Steel Foundries); treasurer, J. G. Rees (Westinghouse Air Brake Co.); secretary, A. R. Nelson (W. H. Miner, Inc.). J. D. Ristine continues as executive secretary.

Filter Design Improved By Radioactive Analysis

Such information as interior flow rates and adsorption areas, which contributes to positive air-brake operation, is being obtained on the Vapolex filter manufactured by the Air Brake Division of the Westinghouse Air Brake Company through the use of radioactive tracers developed by the Nuclear Science & Engineering Corp., Pittsburgh.

Unless filtered, the oil picked up from the compressor on a locomotive and carried along with the air passing into the brake system accumulates as a varnish-like deposit on valves and hinders air-brake operation. Because this oil passage is in vapor form, prior methods of measuring its volume were not positive. By introducing a radioactive isotope into the compressor crankcase oil, Nuclear Science can meter and chart the degree of radioactivity present at critical points in the air system and thus determine filter efficiency, permissible degree of saturation, and service interval for replacement of filter element.

High-Horsepower Locomotives Are Under Test

General Motor's new high-horsepower SD-24 locomotive being demonstrated on the Duluth, Missabe & Iron Range is, essentially, an SD-9 with a turbosupercharger which boosts horsepower to 2,400. It has all-electric controls, including a new 16-stage transition.

The first of the 8,500-hp General Electric gas turbine-electrics is in experimental service on the Union Pacific, handling freight runs between Omaha and Ogden. The UP has 30 of the units on order. At the same time, the UP has been testing a 9,900-hp. gas turbine-electric locomotive produced by coupling two of its older 4,500-hp units in multiple. Fuel is being carried on a tender between the two units.

(Turn to page 10)

TIME SAVING IDEAS FOR NOVEMBER

MOTIVE POWERS AND CAR

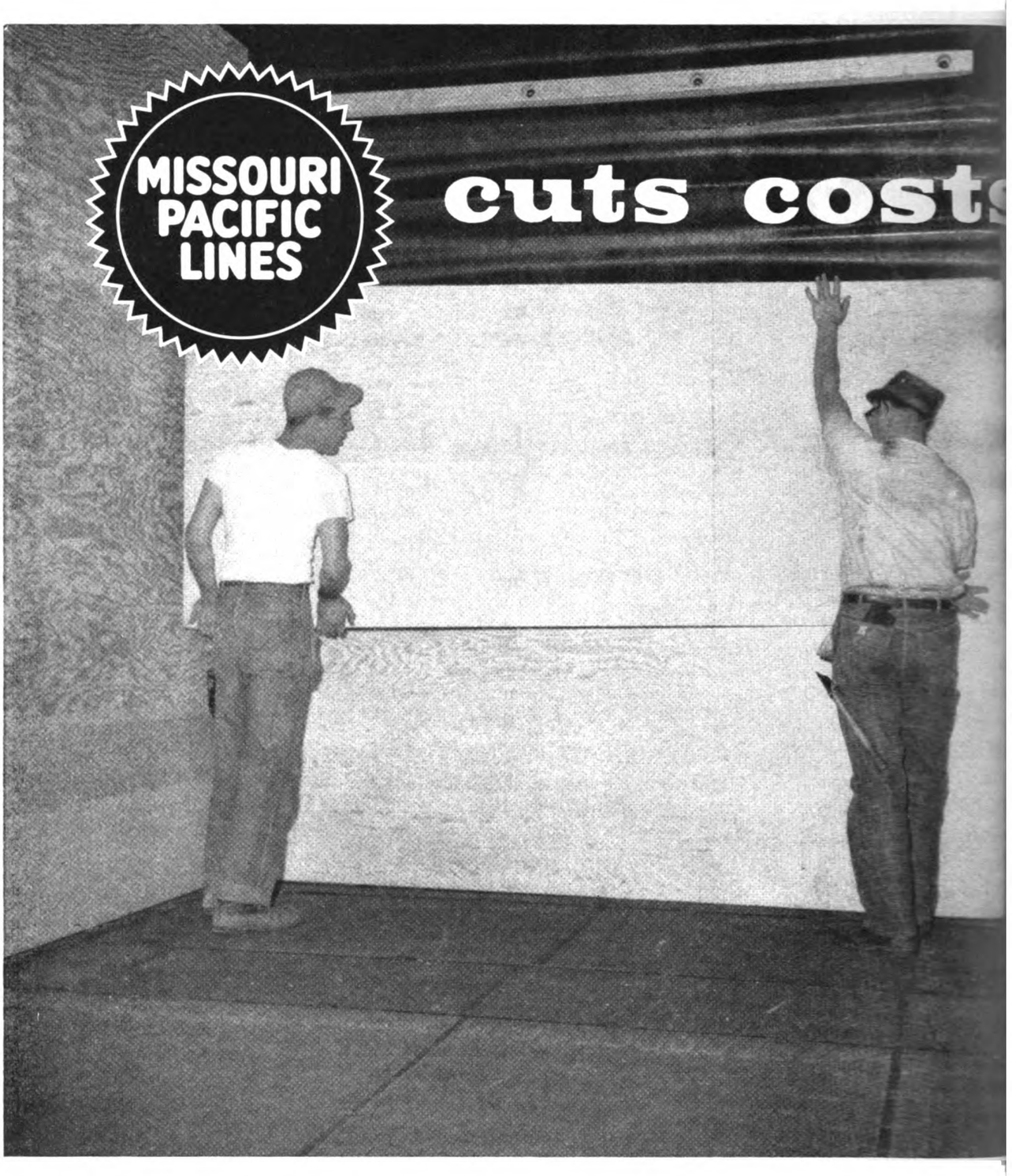
Union Tank Builds Circular Car Shop 25
More Accurate Calibration for Fuel Injectors? 28
To Keep Your Covered Hopper Clean 29
C&NW Coaches 32
Frosty But Not Freezing 33
SP Power Brake Adjuster 34
Southern Pacific Upgrades Box Cars with Plywood 36
"Centralized" Reclamation 40
GN Solves Its Winter Coach Repair Problems 48

ELECTRICAL

Roll Them Out Like New—Armature Stripping 50
They Didn't Double Cross This Diesel 56

DEPARTMENTS

Report 5
Personal Mention 10
Supply Trade Notes 10
What's New in Equipment 12
Questions and Answers 52
Helps from Manufacturers 68



Only Exterior Fir Plywood car lining has all these advantages:

LOW COST—Easy to install fir wood lining speeds work... save per cent and more in labor costs o

ith Fir Plywood
oxcar lining

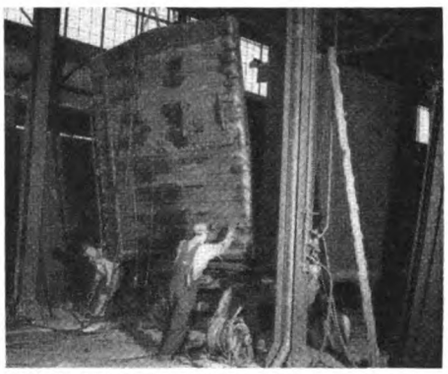
ouri-Pacific reports Exterior plywood ds work, saves 10 man hours per car

OR FIR PLYWOOD car lining plays an important role in the t-moving operation at Missouri-Pacific's construction yard oto, Missouri, where modern assembly line techniques can new boxcar into service every hour of the day.

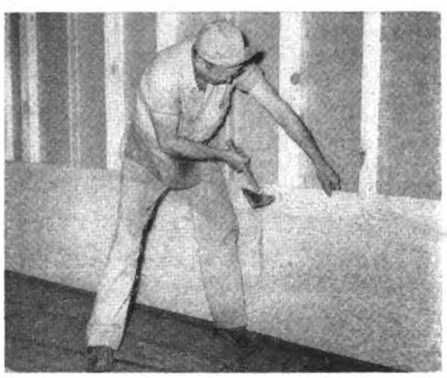
in-place cost of the plywood car lining is less than T & G , chiefly because it can be installed so much faster. Shop estimate that fir plywood saves over 10 man hours per 40-r. Total lining costs (including labor and materials) comes than $220 per car.

Mo-Pac fir plywood has demonstrated its superiority in other oo. Interior surfaces are smooth, and the danger of infesta-ninimized. Shippers like it because it's a clean (and easy-to-lining that protects valuable ladings. Waterproof Exterior d is a strong, tough, rugged material capable of shrugging rs that would split ordinary lumber.

the long haul, too, fir plywood lining pulls its freight with naintenance and longer life.



At their DeSoto shops, Mo-Pac does big things in a big way, *fast*. Specially developed high-speed assembly line technique sends 8 new boxcars into service every day.



Exterior plywood is nailed horizontally with ¾" fir plywood for side walls and 1" fir plywood for end walls. Crews use cement-coated nails with a special spiral thread for better holding power.

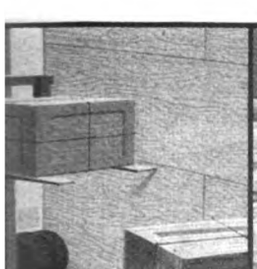
NFORMATION about fir plywood–its uses, properties and advantages–write

LAS FIR PLYWOOD ASSOCIATION
TACOMA 2, WASHINGTON

y-wide organization devoted to research, promotion and quality control

Always specify by DFPA grade-trademarks

DFPA TESTED QUALITY



Plywood has tremendous ce . . . . shrugs off blows it ordinary lumber.

SMOOTH — Clean, snag-free fir plywood lining pays off by yielding higher tariffs on fragile ladings.

WATERPROOF — Exterior plywood is made with waterproof marine glue, in several sizes and grades, including overlaid panels with hard, smooth, fused-resin fiber overlays.

REPORT *FOR NOVEMBER—Continued from page 5*

Miscellaneous Publications

WELDING HANDBOOK. Section II of Fourth Edition of Welding Handbook covers gas, arc and resistance welding processes. Contains 13 chapters, each with a bibliography and its own table of contents. Processes of similar nature grouped, followed by chapter describing various types of equipment and accessories available.

American Welding Society, 33 West 39th st., New York 18. Price, $9.

Personal Mention

Chicago, Milwaukee, St. Paul & Pacific.—*Milwaukee:* WAYNE N. BITTNER, shop engineer, appointed superintendent locomotive shops, succeeding C. G. BENKENDORF, deceased. HAROLD T. ODEGAARD appointed shop engineer, locomotive, wheel and forge shops at Milwaukee and Tomah, Wis.

Florida East Coast.—*St. Augustine, Fla.:* E. H. SCHOEDINGER, assistant chief mechanical officer, appointed chief mechanical officer, succeeding C. A. GAMMON, promoted.

Seaboard Air Line.—*Richmond, Va.:* W. M. HARRISON, JR., mechanical engineer, appointed assistant to chief mechanical officer, succeeding HENRY W. JARRETT, retired. E. T. STEWART, JR., appointed diesel supervisor (system), succeeding H. R. BOYETTE, promoted.

Southern.—*Atlanta, Ga.:* GEORGE L. SOUTHER, JR., appointed master mechanic. *Ludlow, Ky.:* WALTER G. SCHWEINEBRATEN appointed master mechanic.

Orders and Inquiries for New Equipment

Placed Since the Closing of the October Issue

Diesel-Electric Locomotive Orders

Road and builder	*No. of units*	*Horsepower*	*Service*	*Other details*
GRAND TRUNK WESTERN:				
Electro-Motive	9	1,750	*Road switchers*	Delivered.
	7	900	*Yard switchers*	To be delivered by [illegible]

Freight-Car Orders

Road and builder	*No. of cars*	*Type of car*	*Cap, tons*	*Length, ft.-in.*	
BALTIMORE & OHIO:					
Company shops	1,000	Gondola	70	52-6	Major components and assemblies ordered from [illegible] hem Steel. Floors to be combination wood and [illegible] day being delivered.
CANADIAN NATIONAL:					
Canadian Car	20	Hopper	40	....	Delivery to begin [illegible] year.
	50	Auto. transporter		78-0	125 cars to be [illegible]
	75	Auto. transporter		60-0	
CHICAGO & NORTH WESTERN:					
Pullman-Standard	1,000	Box		40-6	To have 8-ft. doors [illegible] a week being delivered cost over $7 million.
DELAWARE, LACKAWANNA & WESTERN:					
Company shops	100	Piggyback flat		....	Being converted from [illegible] equipment. Cars to have ing ramps and ACF [illegible]
INLAND STEEL:					
General American	100	Gondola		....	
SACRAMENTO & NORTHERN: (Subsidiary Western Pacific)					
American Car & Foundry	10	Covered hopper	70	....	Est. cost, $123,4[illegible] livery this month.
TIDEWATER SOUTHERN: (Subsidiary Western Pacific)					
Pacific Car & Fdry.	50	Insulated	50	....	40 to be equipped [illegible] loaders. Est. cost of [illegible] 000.
TRAILER TRAIN CO.:					
American Car & Foundry	200	Flat		85-0	These 400 cars in [illegible]
Pullman-Standard	200	Flat		85-0	order for 400 reported tober issue.
UNION PACIFIC:					
American Car & Foundry	50	Piggyback flat	70	85-0	100 cars to be equipped [illegible]
Pullman-Standard	50	Piggyback flat	70	85-0	roller bearings and [illegible] $1,500,000. For delivery quarter 1959.

FREIGHT CARS:

Missouri Pacific authorizes purchase of 100 37-ft. insulated refrigerator trailers and 50 chassis for piggyback [illegible] tation of perishables. Estimated cost, $1,200,000.

Illinois Central during this last quarter of 1958, will equip 165 box cars for specialty loading; convert 40 [illegible] flat cars for piggyback loading; complete 25 steel cabooses, and convert 25 hopper cars for handling wood [illegible] pairs will also be made on about 100 cars per month.

St. Louis-Southwestern has equipped at company shops 50 52-ft. 6-in. gondola cars with rubber draft gear, [illegible] removable roof, and four-section movable bulkheads.

Supply Trade Notes

ELECTRIC STORAGE BATTERY COMPANY, EXIDE INDUSTRIAL DIVISION.—*Evans Taylor,* sales engineering manager at Philadelphia, appointed branch sales manager, Chicago area, succeeding *Cecil W. Wilson,* retired.

Washington, D. C., branch moved from 1819 L st., to 4000 Albemarle st., N.W.

■

GRIP NUT COMPANY.—*C. A. Henrickson* appointed sales manager, railroad division. *E. H. Weigman,* of Weigman Railway Supply Company, Chicago, who has been Grip Nut railway field representative in the midwest, has retired to Tucson, Ariz., where he will be part-time consultant to Grip Nut.

Evans Taylor
Electric Storage
Battery Co.

C. A. Henrickson
Grip Nut Co.

Seymour Becker
Arcair Co.

S. A. [illegible]
Thomson-[illegible]
Corp.

ARCAIR COMPANY.—*Seymour Becker* appointed field representative, New England states.

■

THOMSON-MANNING CORPORATION.—*S. A. Thompson* appointed director and vice-president of Thomson-Manning, a new corporation at Lynn, Mass., offering rail-welding service and other railroad [illegible] Mr. Thompson previously railroad manager of Sperry Rail Service. [illegible] Sperry Products, Inc.

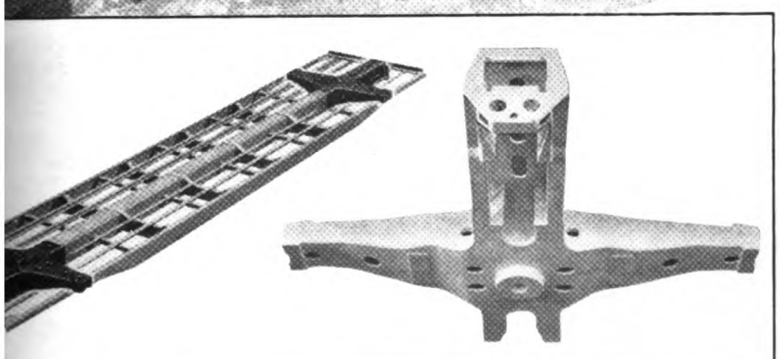
■

SPERRY RAIL SERVICE, Div. of SPERRY PRODUCTS, INC.—Duties [illegible]

(*Continued on page* [illegible])

Where railroad progress is cast in steel....

Many Great Northern Box Cars roll across America's road beds—equipped with General Steel one-piece underframe ends that assure dependable, long-life service.



***es with** one-piece cast steel **ide great** strength, eliminate **er failures,** resist rust and cor- **simplify** car construction or*

General Steel underframe ends provide the following features for new or rebuilt cars: integral body bolsters, draft gear stops, strikers, coupler carriers, center fillers, center plates and side bearing pads.

For over 50 years, General Steel has proved its unequaled ability to extend the life of railroad equipment through the application of cast steel products.

General Steel engineering utilizes the great strength and minimum weight of one-piece steel castings . . . together with their extra ruggedness and freedom from maintenance . . . to cut operating expenses for rail and industrial users the world over.

An investment in General Steel products today means a more profitable future.

ENERAL STEEL CASTINGS

GEARED TO PROGRESS
P R I
MEMBER

RANITE CITY, ILL. · EDDYSTONE, PA. · AVONMORE, PA.

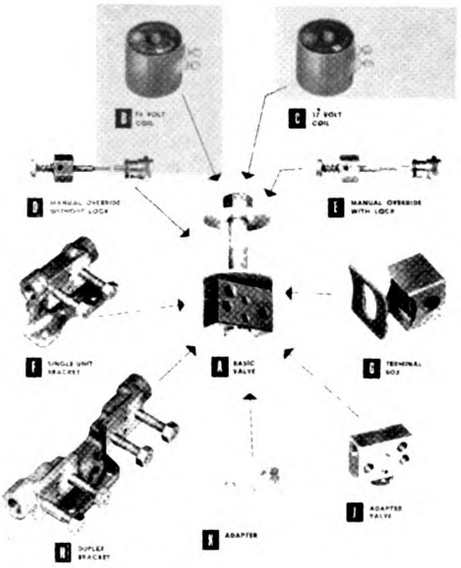
Metal Removal Torch

The Model H-2 Arcair torch, which replaces the Model G-2, is the smallest manually operated Arcair torch. It is designed for intermittent applications and for light uses of the Arcair process. It has a positive air control valve in the torch handle and, by holding the air orifice in the head of the H-2 within 4 in. of the work, the torch can be operated on as low as 40 psi of compressed air—half the required minimum air pressure used by the larger models. The torch has heat-resistant molded insulators. *Dept. 137, Arcair Company, Dept RLC, Lancaster, Ohio.*

Lubricator Pad

The new Magnus lubricator pad, which features three-way wicking, large oil capacity, and one-piece twin-lobe construction, has been approved by the AAR Mechanical Division for interchange test installations. The pad is a one-piece unit consisting of two elliptical spring cores around which is wrapped a $\frac{5}{16}$-in. thick felt inner liner covered with a tufted cotton fabric. Each lobe of the pad is laced with eight perpendicular candle wicks surrounding a polyurethane center core. Both ends are covered with heavy bolting cloth. Webbing loop handles at the center of either end and at each corner aid in removal. Three firmly connected flat steel springs in each lobe maintain constant and correct pressure on the journal. They are secured to the underside of the felt and cover and are riveted to spring steel spacer strips.

Each pad is 6 in. by 11 in. and holds up to 5.9 pt of oil, depending on the size required by axle capacity. It is said to be the only pad type lubricator with internal wicks that are not entrapped in the uplift medium. The pad has two wear surfaces. After operation through one repack period and reclamation, it may be reapplied with the clean unused side in contact with the journal. *Magnus Metal Corporation, subsidiary National Lead Company, Dept. RLC, 111 Broadway, New York 6.*



Solenoid Valve

These railroad-type solenoid (magnet) valves for diesel-electric and electric locomotive applications, make possible the alteration of a basic valve into solenoid valves for various requirements. Two or more of the 10 basic components shown can be combined to assemble valves for over 40 locomotive applications.

This valve simplifies maintenance because it can be repaired without special tools, and can be serviced without disturbing locomotive piping. It can be furnished for 32-volt or 74-volt d-c applications. *Prime Manufacturing Company, Dept. RLC, 1669 S. First st., Milwaukee 4.*

Adjustable Bulkhead

An adjustable "bookend" bulkhead, first built and tested two years ago, has been strengthened and is undergoing further tests. The movable bulkhead, designed to fit any standard AAR flat car, now has two hori instead of three, vertical panels of Me plywood. A 12-in. reinforcement chann at top provides a rigid support for th scoping type diagonal braces, the en which lock securely in the stake pocke the bottom, a 10-in. movable channel in place on each side to a horizontal section weldment which can be fre sitioned and anchored in the stake pa The 10 ft wide and 8 ft high bulkh held in place also by pins through g welded to the top and bottom channe

The design, as before, allows the heads to be placed flush against ladi as plywood, lumber, gypsum shipment and eliminates much dunnage. Weight assembly is 1,600 lb. Rectangular hol the bulkhead permit positioning with a lift truck and for application or re from car if necessary or desirable. *In Development Services, Dept. RLC Moines, Iowa.*

Pipe Cutters

A line of pipe cutters, designed to give cle straighter cuts, feature new high-alloy cutting wheels, sliding-block construction placeable slide plates, and longer shaft protect the threads. A new form-fitting ha designed to fit the hand, and th malleable frames, are said to lengthen life of these cutters, which are available four models for pipe from ⅛ to 2 in. *Pipe Threading Machine Compan RLC, 1445 Summit st., Toledo 4, Ohio.*

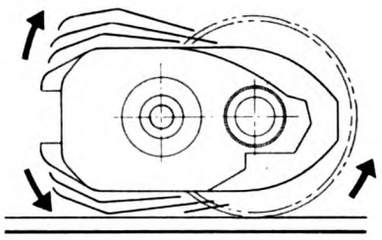
Nylon Tie Speeds Wire Bundling

The Ty-Rap, tie molded of 101 Zytel permits the tight binding of harnesses, dles, or groups of wires faster than the pr method of string tieing, without slippage relaxing or damage to wire insulation. slipped under the wire bundle and its tip brought around and pulled through at the opposite end of the tie. A s installing tool automatically cuts the Ty

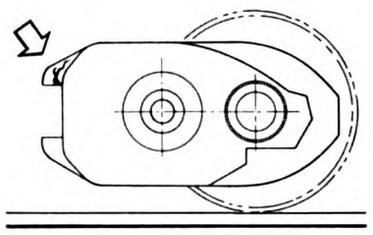
(*Continued on page 14*)

A NEW IDEA IN TRACTION MOTOR PROTECTION—

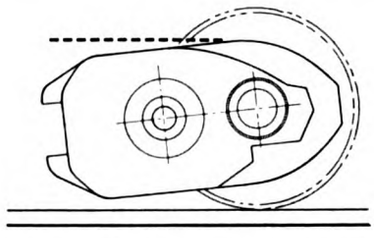
LORD traction motor nose supports



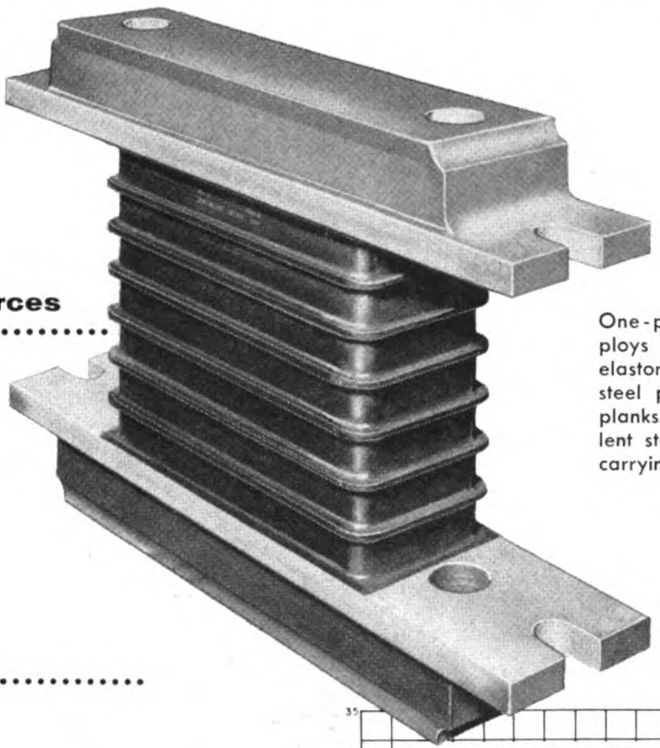
cushion damaging shock forces



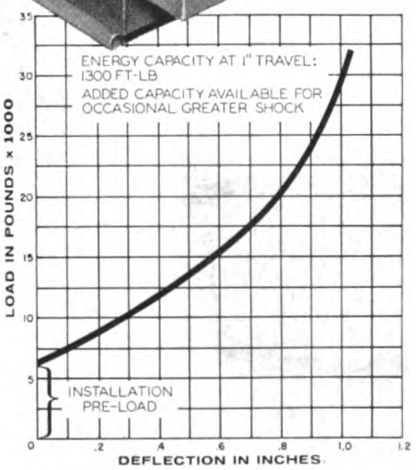
end motor nose lug failure



assure non-sagging support



One-piece construction employs specially compounded elastomer bonded to multiple steel plates and two spring planks. Design provides excellent stability and high load-carrying capacity.



Stiffness characteristics of Lord Nose Supports increase gradually, permitting smooth absorption of all road shocks and torque impulses.

Here's the answer to costly maintenance of locomotive traction motors caused by heavy wheel-to-rail shock.

LORD Traction Motor Nose Supports effectively cushion all damaging reactions during sudden load changes, slip-grab conditions and reverses. Using the excellent shock absorption properties of rubber in compression, the high-strength bonded rubber units give full protection against even the heaviest shock loads. No solid "bottoming" is possible. And destructive vibrations are controlled.

Installed pre-compressed, they always provide positive energy absorption and overcome the problem of sagging supports. Long service life is insured by custom-compounded elastomer. No maintenance is required other than possible replacement of wear plates.

Designs are available for economical replacement of traction motor nose supports on all makes of diesel-electric locomotives. For additional information on this and other products for railroad application, call the nearest LORD Field Engineer or the Home Office, Erie, Pennsylvania.

LORD
BONDED RUBBER

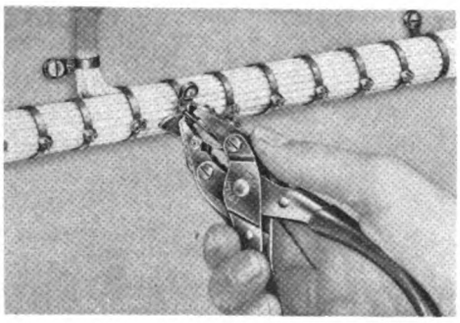
FIELD ENGINEERING OFFICES

ATLANTA, GEORGIA - CEdar 7-9247
BOSTON, MASS. - HAncock 6-9135
CHICAGO, ILL. - MIchigan 2-6010
CLEVELAND, OHIO - SHadyside 9-3175
DALLAS, TEXAS - RIverside 1-3392
DAYTON, OHIO - BAldwin 4-0351
DETROIT, MICH. - DIamond 1-4340
KANSAS CITY, MO. - WEstport 1-0138
LOS ANGELES, CAL. - HOllywood 4-7593
NEW YORK, N. Y. - CIrcle 7-3326
PHILADELPHIA, PA. - PEnnypacker 5-3559

"In Canada—Railway & Power Engineering Corporation Limited"

LORD MANUFACTURING COMPANY • ERIE, PA.

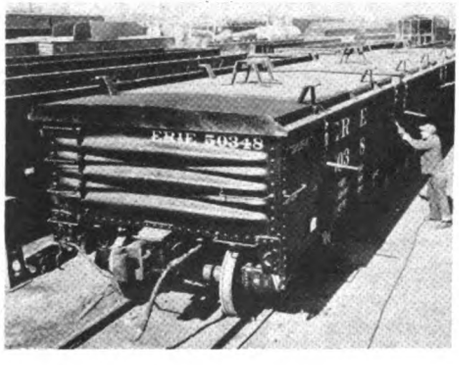
WHAT'S NEW IN EQUIPMENT—*Continued from page 12*



to proper length and locks it in place.

Another Ty-Rap of similar design has self-clinching teeth in the hub. When the tip of the self-clinching Ty-Rap is inserted through the hub and pulled tightly, the teeth prevent it from withdrawing or loosening.

The Ty-Ray weighs only 1/35 oz, can accommodate wire bundles from 1/16 through 1¾ in. in diameter, and can support up to 30,000 times its own weight. It is available in milky white, red, blue, yellow, brown, green or black for color-coding applications. *Thomas & Betts Co., Dept. RLC, 36 Butler st., Elizabeth, N. J.*



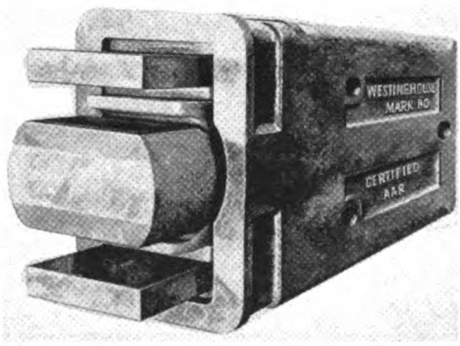
Gondola Car Cover

A tri-section "flat top" corrugated-steel cover for gondola cars provides full weather protection for steel bars, sheets, forgings, etc., usually transported in open cars. Republic's original hood-type cover protects coiled steel stock.

The new cover protects flat loads, or those that can be palletized or unitized and handled by sling. It is in three sections, for partial or complete loading, and lies flat across the bulb channels of the car, where it is positioned by centering pins and sealed with load binders, or other clamping devices. The covers, fabricated from corrugated steel for stiffness and strength, fit any standard-width gondola, 40 to 52 ft long. A lip at either end of the center cover overlaps the adjoining end pieces, keeping weather out. Steel lifting brackets on each section permit center grab by C-hook or chain sling. Steel brackets at the edges of the cover permit stacking. First applications are being made on the Erie. *Berger Division, Republic Steel Corporation, Dept. RA RLC, 1080 Belden ave., Canton 5, Ohio.*

Cutout Cocks with Teflon Coated Keys

The Teflon coating on the permanently lubricated keys of these improved cutout cocks is chemically inert and not subject to corrosion. It never dries or gets carried off through the system like conventional lubricants. Because of its relative softness and cold flow characteristics, the coating conforms to slight irregularities which might otherwise cause leakage, thus maintaining the sealing ability at mating surfaces throughout a longer service life. Foreign material is readily sloughed off in the course of normal operation because of the smooth, grease-free surface of the keys. Damage resulting from forceful operation of sluggish valves is eliminated because of the much lower operating torque exhibited by the permanently lubricated keys throughout their position range. *New York Air Brake Company, Dept. RLC, 230 Park ave., New York 17.*



Friction Draft Gear

The Mark 80 friction draft gear, now available for the alternate standard 36-in. draft pockets in freight cars, has been conditionally approved by the AAR Mechanical Division. It is said to give several times more protection than the 24 5/8-in. pocket gears. It is constructed of alloy steels and has an official capacity of 77,320 ft-lb at 4.39 in. of travel with 447,000 lb of reaction force. *Cardwell Westinghouse Company, Dept. RLC, 332 S. Michigan ave., Chicago 4.*

Combination Vise and Stand

The 7C vise stand with chain vise, 1/8 in. to 5 in., and the 7Y with yoke vise, 1/8 in. to 2½ in., recently added to the Toledo line of pipe tools have sturdy steel folding trays that prevent collapsing. The large tightening handle is on top of the 7C, and compound leverage is applied to chain that falls into lever hook automatically, requiring minimum turns on screw. Either model can be converted from chain to yoke, or yoke to chain, with just a few additional parts. The large vise bases have three pipe benders located

over the rear leg, preventing tipping bending pipe. Rubber grommets in ... prevent creeping. Both vise stands ar... easy to carry and set up. *Toledo Pipe ... ing Machine Company, Dept. RLC ... Summit st., Toledo 4, Ohio.*

Hex Wrench

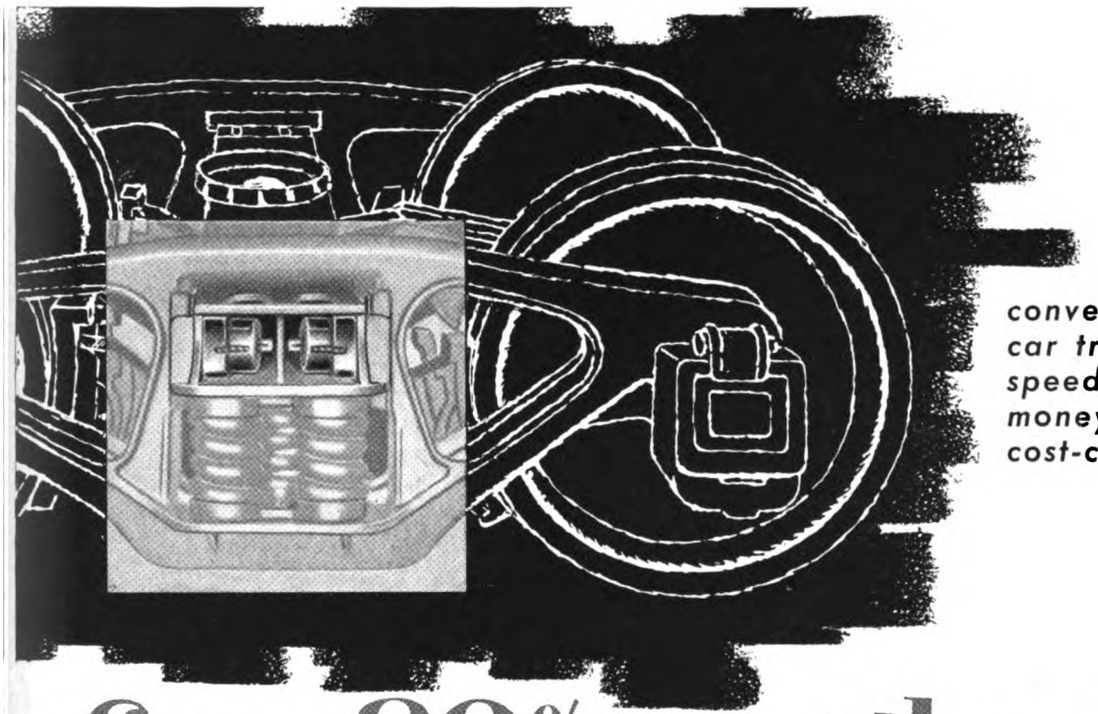
A new Ridgid hex wrench has an a... four-sided jaw that is easy to put on ... off. Angular jaw design is said to giv... leverage plus time-saving, positive grip ... nuts, square nuts, valve packing nuts ... and gas cocks, rough or finished. ... jaws make work easy in tight place...

The wrench, of heavy-duty constru... available in three sizes—No. 11 for ... to ¾-in., No. 17 for 5/8-in. to 1¼-... No. 25 for 1 in. to 2-in. nuts. The ... grip I-beam handle of special malleable ... has a hang-up hole. *Ridge Tool C... Dept. RLC, Elyria, Ohio.*

Flood Lamp

The Fluomeric lamp combines feat... incandescent, fluorescent and mercury ... lighting. It screws into an ordinary ... socket, requires no auxiliary equipme...

(*Continued on page 16*)

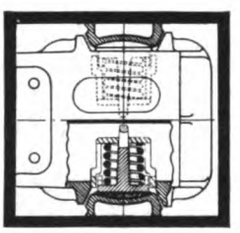


convert old freight car trucks to high speed service this money-saving, cost-cutting way!

Save 80% over the cost of new Freight Car Trucks

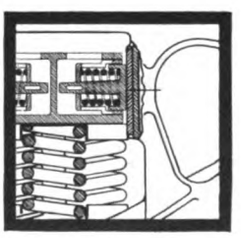
with the NEW HOLLAND RIDE STABILIZER RS-2

NEW



New Large control spring for full face pressure, longer life.

NEW



New Center Retention Means for simplified assembling and dismantling.

There's no need to let those serviceable old Freight Car Trucks be limited to slow speed service when you can convert them to profitable operation at a fraction of the cost of new trucks... The Holland Ride Stabilizer RS-2 has proven to give the same high-speed, lading-protecting, easy-riding characteristics you get in new, costly freight trucks.

You can convert any bolster of A. A. R. approved design and stabilize the ride laterally, vertically and longitudinally... Installation of the RS-2 components is unusually simple... And Holland Engineers will give you on-the-job assistance. Write or call for the new Tell-All Bulletin RS-2.

Holland Volute Snubber Springs

Either 2½" or 1⅝" Spring Travel.

STYLE E-2 Volute Snubber Spring, 2½" Travel in 50 Ton Group.

Upgrades ride by introducing an unusually smooth snubbing action with an exceptionally high load carrying capacity. Holland's principle of utilizing the sliding action of telescoping radially compressed coils with ample friction area, eliminates the "bombarding" problem.

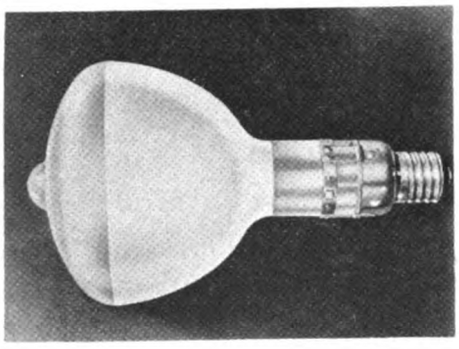
HOLLAND COMPANY

332 S. MICHIGAN AVE. • CHICAGO 4, ILLINOIS

for the finest in freight car truck controls!

618

WHAT'S NEW IN EQUIPMENT—*Continued from page 14*

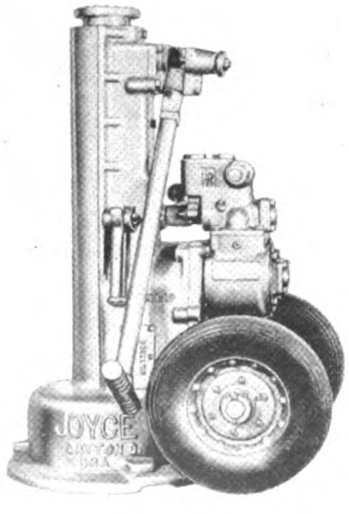


attains full brilliance almost immediately. It has a hard-glass, heat-resistant outer bulb plus an extra-sturdy brass strap base.

It is manufactured in wattages of 450 and 750 and designed to burn 6,000 to 12,000 hr, yielding 30 lumens per watt.

To produce its light and color rendition, the Fluomeric combines a pure tungsten incandescent filament, a mercury vapor arc tube and fluorescent phosphors. They produce a full-spectrum golden-white light of high intensity.

In addition to multiple indoor uses, the lamp is recommended for outdoor installations. Requiring only the simplest open-faced reflector or hood, it is readily adaptable for flood-lighting. *Duro-Test Corporation, Dept. RLC, North Bergen, N. J.*

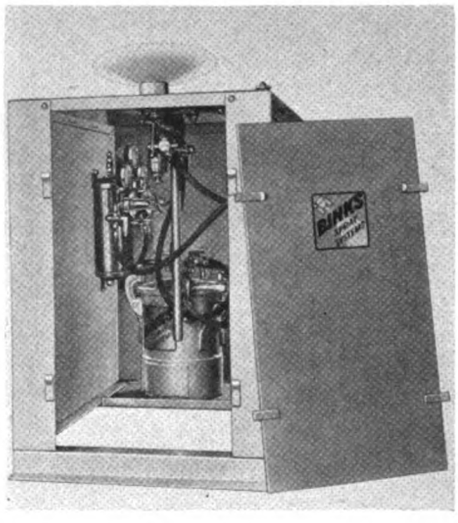


Air-Motor Jack

A 25-ton jack, the 1725-R, is recommended for use in railroad repair shops. The model is available with toe lift. Equipped with trundling handle and large semi-pneumatic tires, the jack can be moved easily. Power is provided by a heavy-duty Ingersoll-Rand air motor.

The toe lift can be quickly slipped into place for lifting loads too low for the jack's standard lifting cap on top of the piston. The jack has spur gearing, anti-friction bearings, pressure lube fittings, automatic shut-off at top and bottom of rise, and positive safety controls.

Closed height is 28 in.; piston rise, 18 in., and weight, 245 lb. *Jack Division, Joyce-Cridland Company, Dept. RLC, 2027 East First st., Dayton 3, Ohio.*



Hose Coupling Servicing Unit

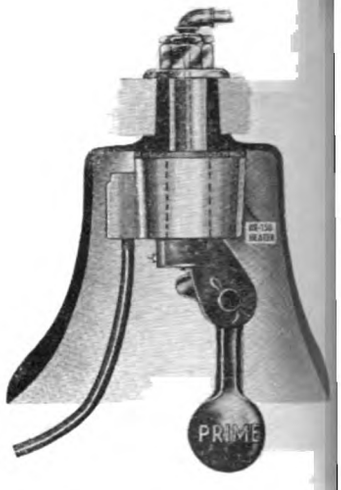
A compact unit for spraying rust preventive materials in the gasket grooves of air brake hose couplings said to eliminate rust in the couplings and prevent air leakage. The unit, is operated by placing the coupling over the spray gun on the top of the cabinet and pressing the spring loaded air valve. The spray gun delivers a circular spray of rust preventive into the coupling grooves.

The unit does not require skilled labor and the automatically controlled spray conserves material. It is a metal cabinet 24 in. wide, 34 in. deep and 34 in. high, containing a 2-gal pressure tank, air cleaner, air regulators and gages, adjustable bracket on which is mounted an air operated spray gun and spring loaded air valve. *Binks Manufacturing Company, Dept. RLC, 3122 Carroll ave., Chicago.*

Bell-Ringer Heater

The new Prime bell-ringer heater operates from 74 volts d-c and has a current draw approximating a 30-watt bulb. It will prevent air-line moisture from freezing in temperatures as low as 70 deg below zero. If a locomotive has been standing overnight, the heater will thaw the bell ringer in a few minutes.

This bell-ringer heater, Part No. BR-150, can be installed on any BR-106 bell ringer without the use of special tools and without



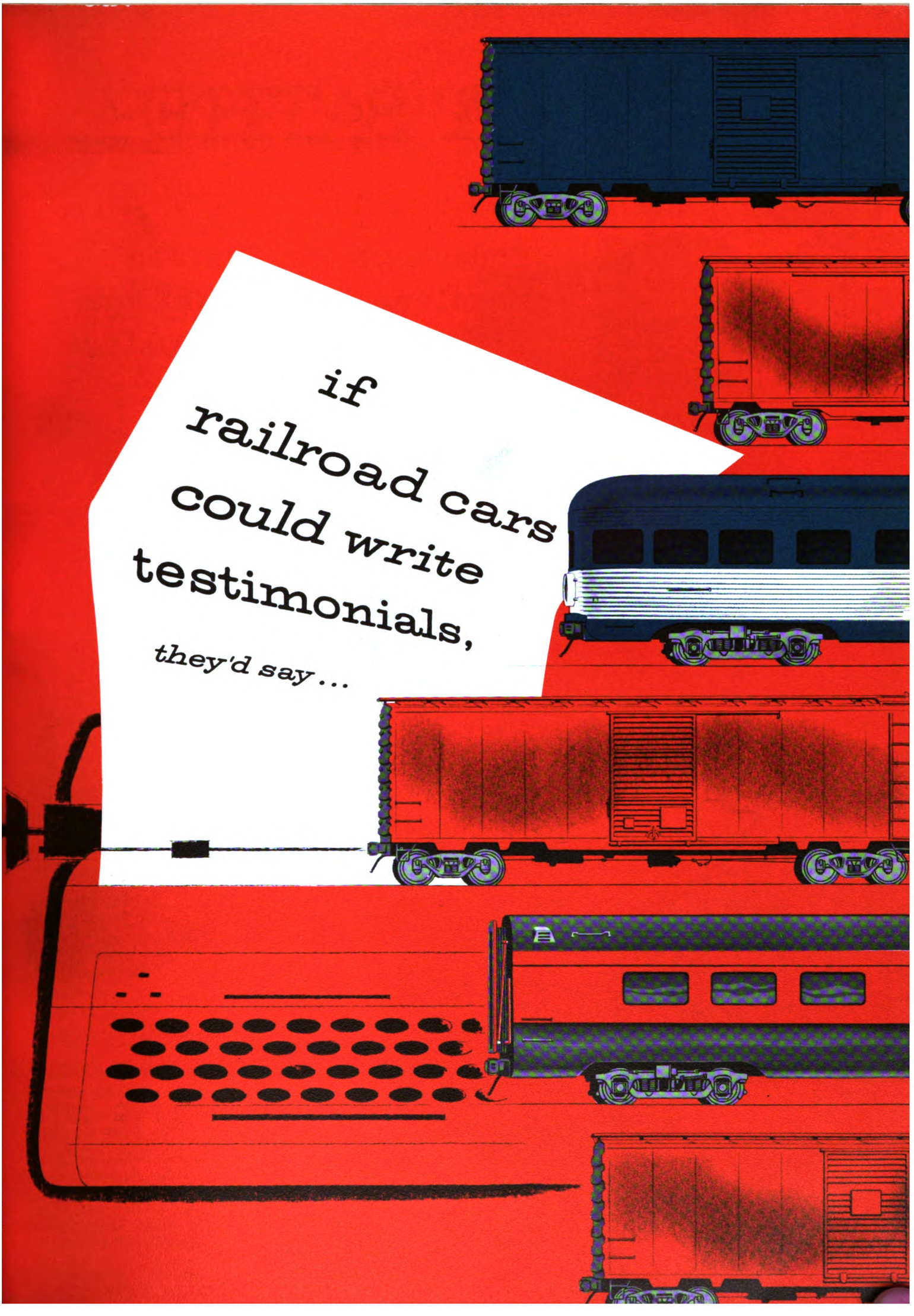
removing the ringer from the bell. The slip fits over the stem of the bell *Prime Manufacturing Company, Dept. 1669 S. First st., Milwaukee 4.*

Tool Truck

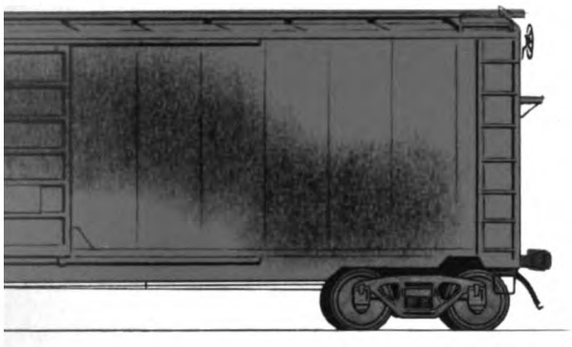
The KRD-340 truck for transporting tools be moved up and down stairs while loaded. Two 10-in. diameter wheels and 2¾-in. diameter front casters permit handling, even in restricted areas. By against a kick-plate at bottom rear unit and simultaneously pulling on the dles, the truck is tipped backward just to balance properly on the large rear then pushed to the job. By rolling on all four wheels, it can be moved around machinery and other obstruct

The truck is 39 in. high, 30 in. wide

(*Continued on page 65*)


if
railroad cars
could write
testimonials,
they'd say...

"IT'S THE



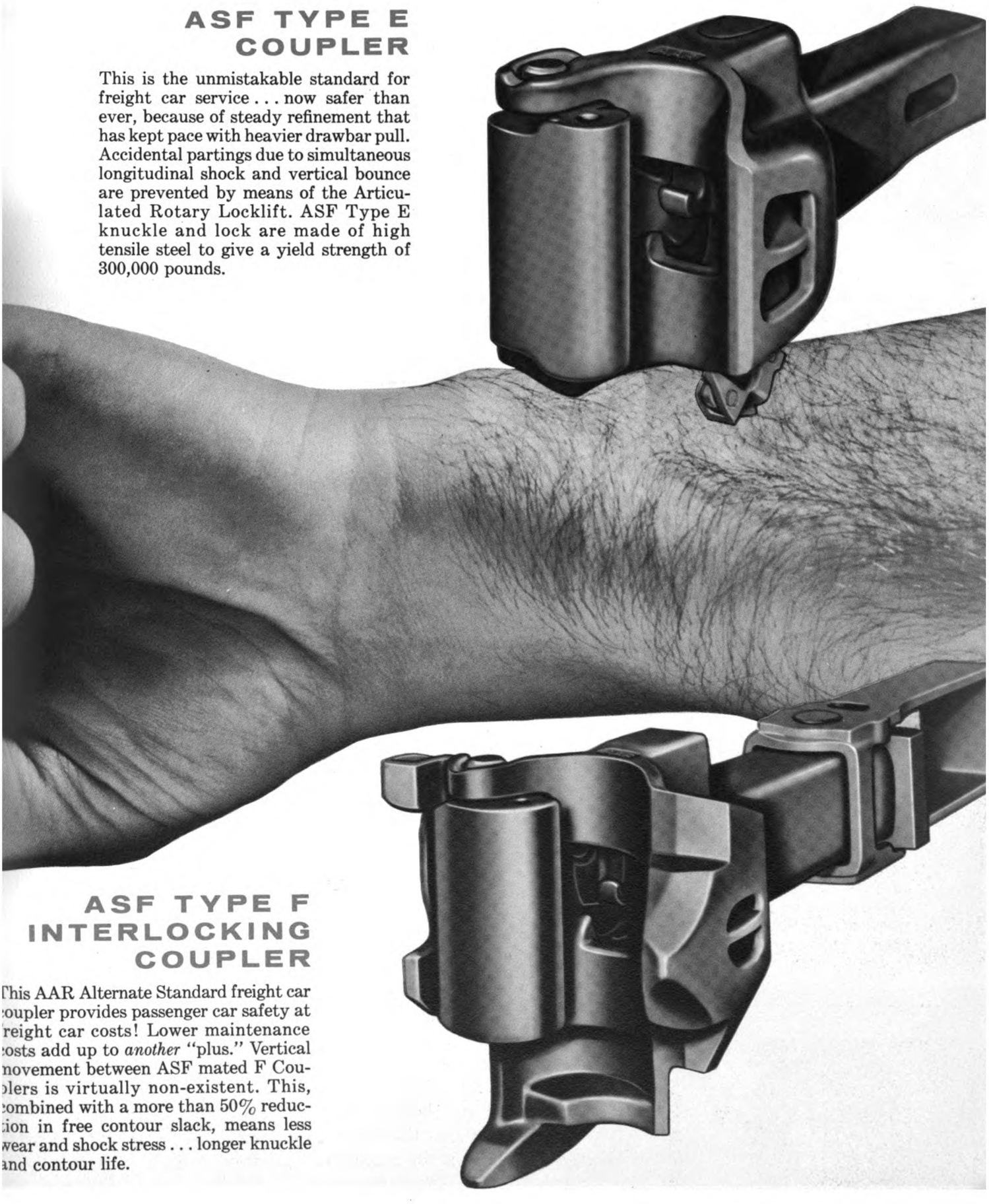
Today's Modern Traffic Handling Demands Maximum Strength in Car Couplings

At American Steel Foundries, maximum strength in car couplings is taken seriously. So seriously, in fact, that absolute coupler *perfection* is taken for granted. As engineers in steel, we are constantly striving to *improve* on perfection . . . aspiring to make ASF Couplers (only ASF makes all four AAR-APPROVED designs) the safest links between railroad cars the world has ever known. This is the yardstick by means of which we evaluate ourselves. This is the motivating force that keeps our research and quality control people burning the midnight oil.

RIP THAT COUNTS!"

ASF TYPE E COUPLER

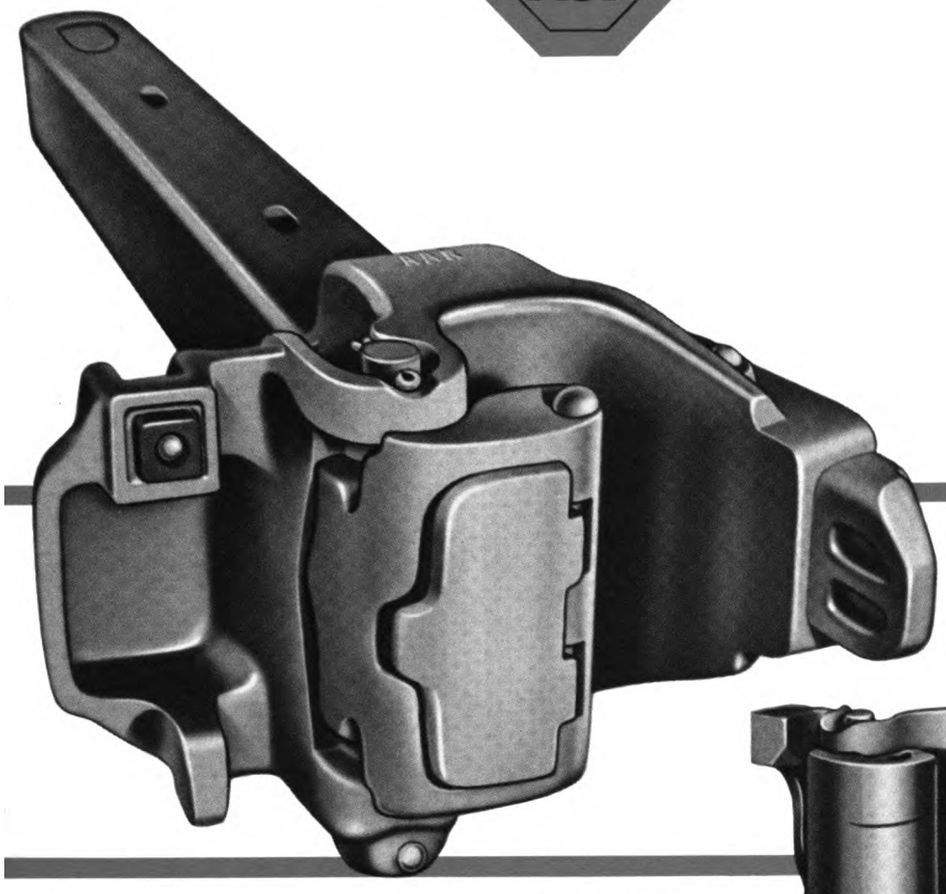
This is the unmistakable standard for freight car service . . . now safer than ever, because of steady refinement that has kept pace with heavier drawbar pull. Accidental partings due to simultaneous longitudinal shock and vertical bounce are prevented by means of the Articulated Rotary Locklift. ASF Type E knuckle and lock are made of high tensile steel to give a yield strength of 300,000 pounds.



ASF TYPE F INTERLOCKING COUPLER

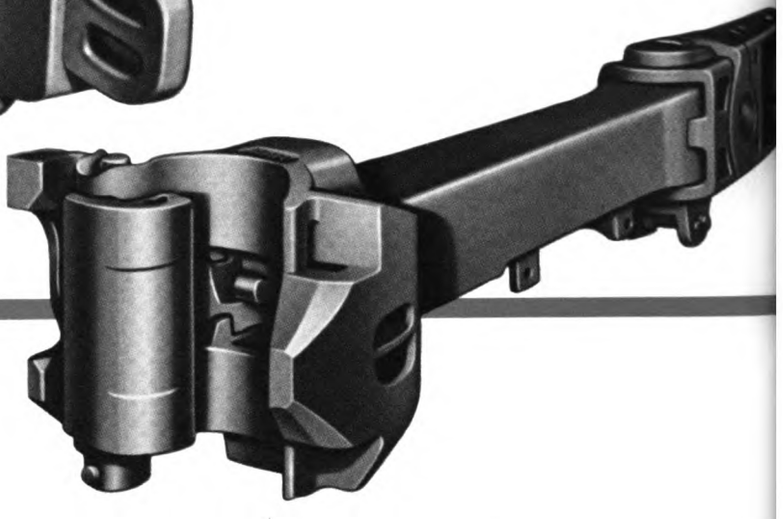
This AAR Alternate Standard freight car coupler provides passenger car safety at freight car costs! Lower maintenance costs add up to *another* "plus." Vertical movement between ASF mated F Couplers is virtually non-existent. This, combined with a more than 50% reduction in free contour slack, means less wear and shock stress . . . longer knuckle and contour life.

"IT'S THE ASF GRIP THAT COUNTS!"



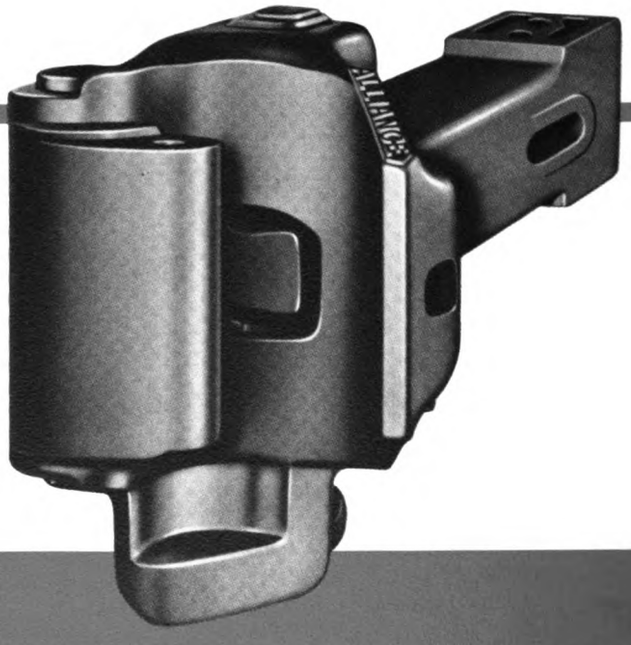
ASF CONTROLLED SLACK COUPLER

Maximum safety and operational smoothness—combined with minimum cost—make this the ideal coupler for new passenger cars. ASF's Controlled Slack Coupler solves the problems of objectionable coupler noise and the shocks of free slack. It positively interlocks, both vertically and horizontally . . . and mates with all AAR Couplers, as well as older MCB Couplers.



ASF TYPE H TIGHTLOCK COUPLER

The ASF Type H Tightlock Coupler is the premium coupler for passenger car use. Mating is unbelievably close, and stresses are distributed over a larger surface area, because ASF *machines* the components of this coupler to precision tolerances.



ASF ALLIANCE® INTERLOCKING COUPLER

This service-proved coupler offers railroads operating outside AAR interchange territory all the safety features of vertical interlocking. Dependable performance on thousands of railroad cars throughout the world attests its worth.

AMERICAN STEEL FOUNDRIES

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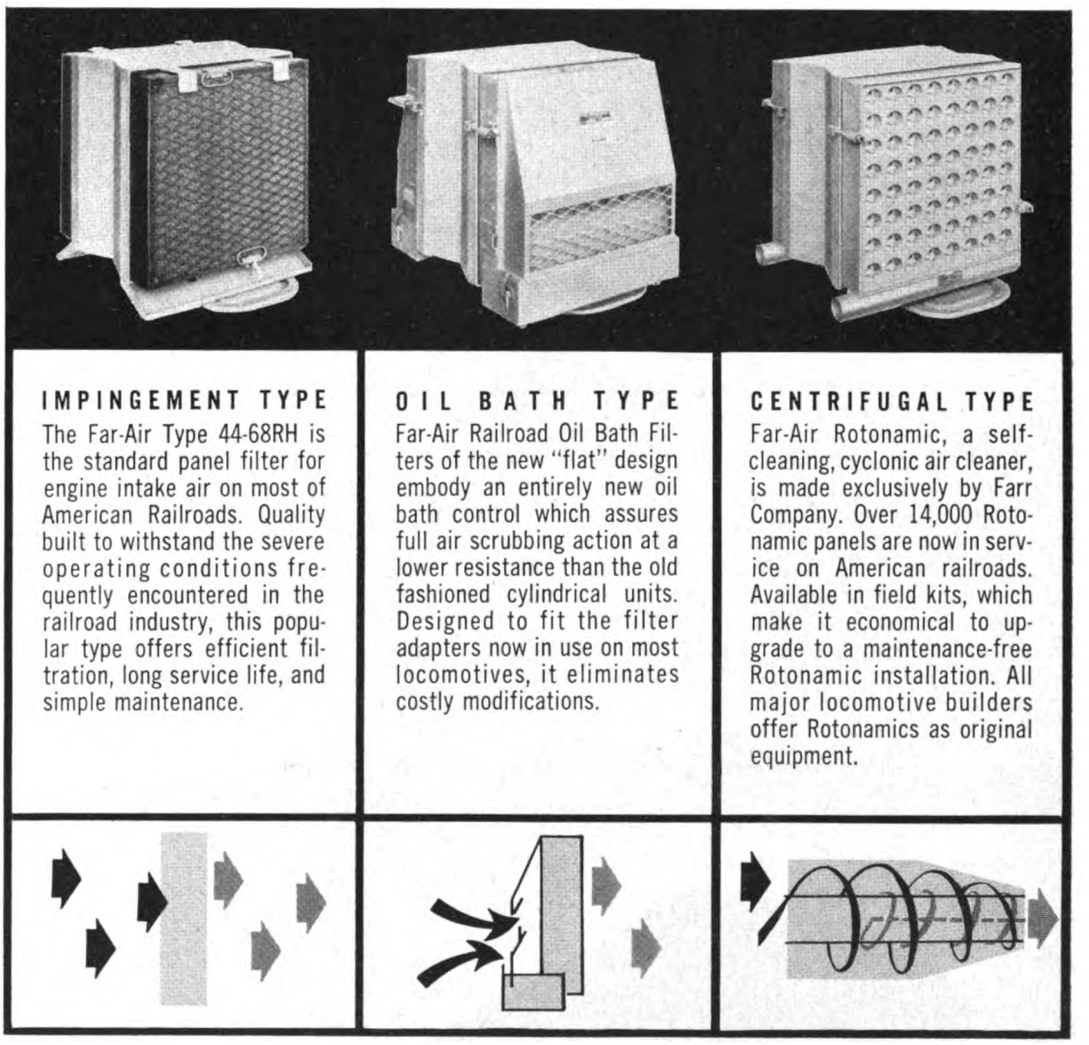
FARR makes what it takes...

the only complete line of air filters designed for diesel locomotives



IMPINGEMENT TYPE

The Far-Air Type 44-68RH is the standard panel filter for engine intake air on most of American Railroads. Quality built to withstand the severe operating conditions frequently encountered in the railroad industry, this popular type offers efficient filtration, long service life, and simple maintenance.

OIL BATH TYPE

Far-Air Railroad Oil Bath Filters of the new "flat" design embody an entirely new oil bath control which assures full air scrubbing action at a lower resistance than the old fashioned cylindrical units. Designed to fit the filter adapters now in use on most locomotives, it eliminates costly modifications.

CENTRIFUGAL TYPE

Far-Air Rotonamic, a self-cleaning, cyclonic air cleaner, is made exclusively by Farr Company. Over 14,000 Rotonamic panels are now in service on American railroads. Available in field kits, which make it economical to upgrade to a maintenance-free Rotonamic installation. All major locomotive builders offer Rotonamics as original equipment.

This complete line of Far-Air railroad filters assures you the best in engine air filtration, no matter what type you may select. Farr Company has long experience in designing and building filtration equipment for railroads, in fact Far-Air filters now protect over 85% of all locomotives operating in America.

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FARR COMPANY

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Intermit Ltd.
Birmingham, England

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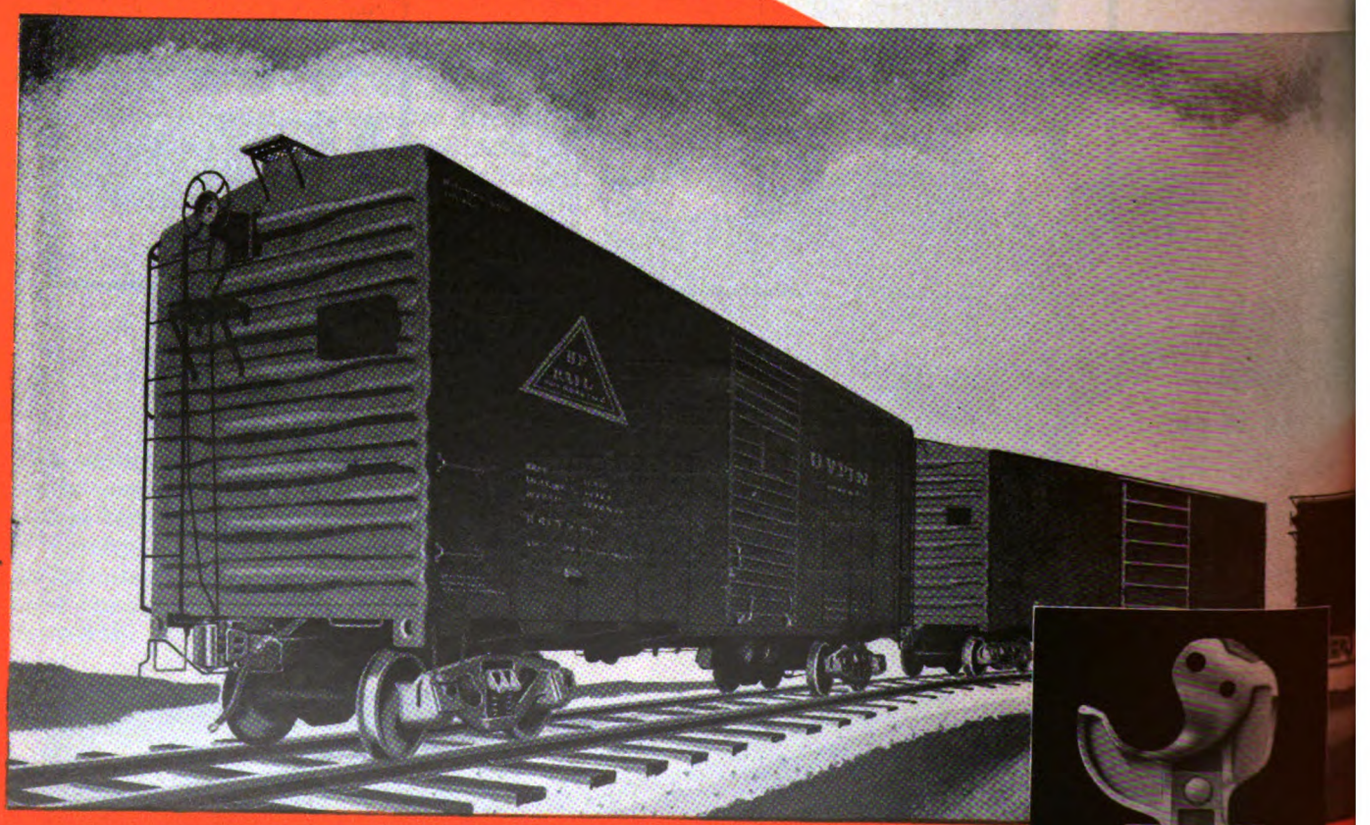
TECHNICAL INFORMATION

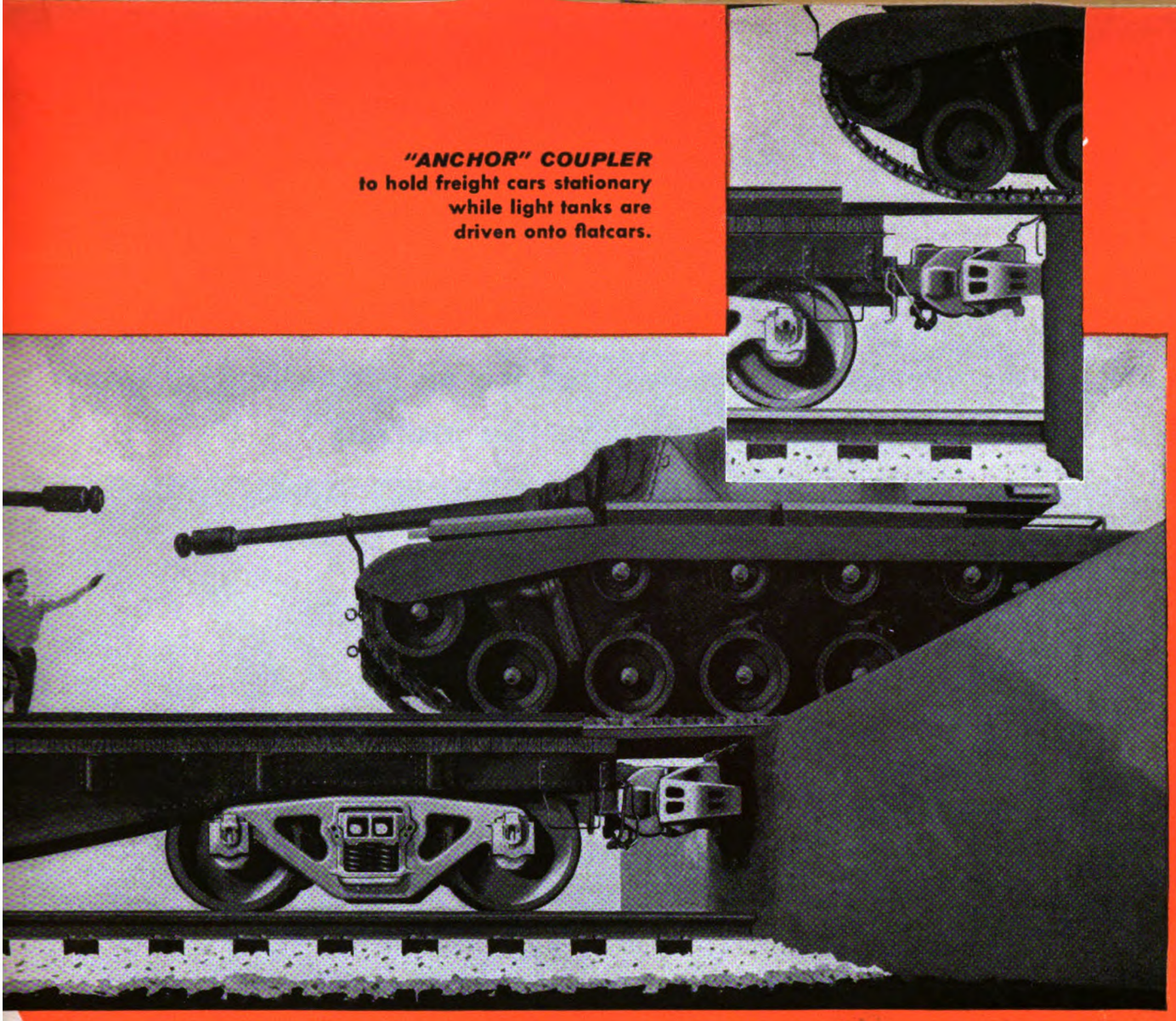
Key to Successful Railroading

Call the

COUPLER SPECIALISTS



"DOUBLE-ENDED" COUPLER
specially designed for an individual road, to permit turning curves of unusually short radius.



"ANCHOR" COUPLER
to hold freight cars stationary while light tanks are driven onto flatcars.

National is more than just a coupler producer. Indeed, National is both a coupler manufacturer and a coupler *service organization* whose activities are both national and international in scope.

Whether your coupler problems are "routine," or whether they are "special" . . . it will pay you to call in the *Coupler Specialists—National.* AA-7606

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868

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Cleveland 6, Ohio

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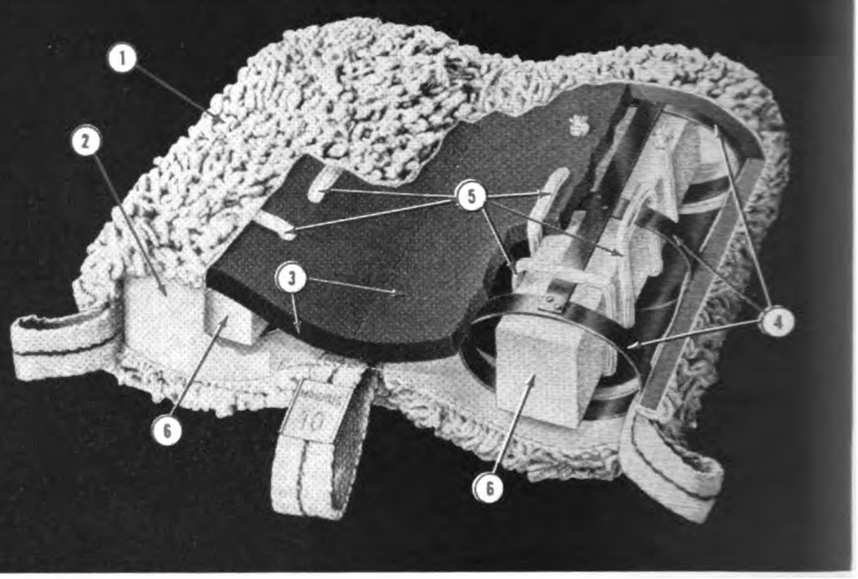
COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • JOURNAL BOXES

IN THE NEW MAGNUS LUBRICATOR PAD

these six safety features assure an abundant supply and maximum flow of oil to the journal

Here's a long-lasting pad of unique design that combines all the known best qualities of pad construction for efficient journal lubrication — the result of 3-years intensive laboratory testing



What you need in a lubricator you get in the new Magnus Pad. It's a sturdy one-piece twin-lobe design — assuring long life. There's 3-way wicking from an abundant oil supply. Construction features are:

1. Outer Cover of tufted premium quality cotton yarn with heavy duck backing provides an ideal, glaze-resistant application and absorption surface. For proper fit, it is shrunk prior to assembly, and both ends are stitched to prevent raveling and bunching in service.
2. End Covers of cotton bolting cloth web assure lasting strength and flexibility, keep dust and dirt out, restrict oil loss.
3. One-Piece Felt Pad backs up the tufted cover and is sewn together to make a single pad, with twin-lobe design, that is far more rugged and has better capillarity than two separate pads.
4. Flat Steel Springs—three firmly connected springs in each lobe maintain constant and correct pressure of the pad on the journal. Scaleless tempered spring steel will not sag. The springs are firmly secured to the underside of the felt and cover and are riveted to spring steel spacer strips, positively preventing misalignment or contact of springs with journal.
5. Internal Wicks of 25-ply Bostonia provide 16 supplementary oil paths from the bottom to the top of each Magnus Lubricator Pad. Thus the design includes a combination of circumferential wicking, internal wicking and center-feed wicking.
6. Polyurethane Cores increase oil reservoir capacity, contact the internal wicks to increase oil flow.

Ask your Magnus representative to tell you more about the new Magnus Lubricator Pad. He'll gladly comply. Or write to Magnus Metal Corporation, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4, Ill.

MAGNUS

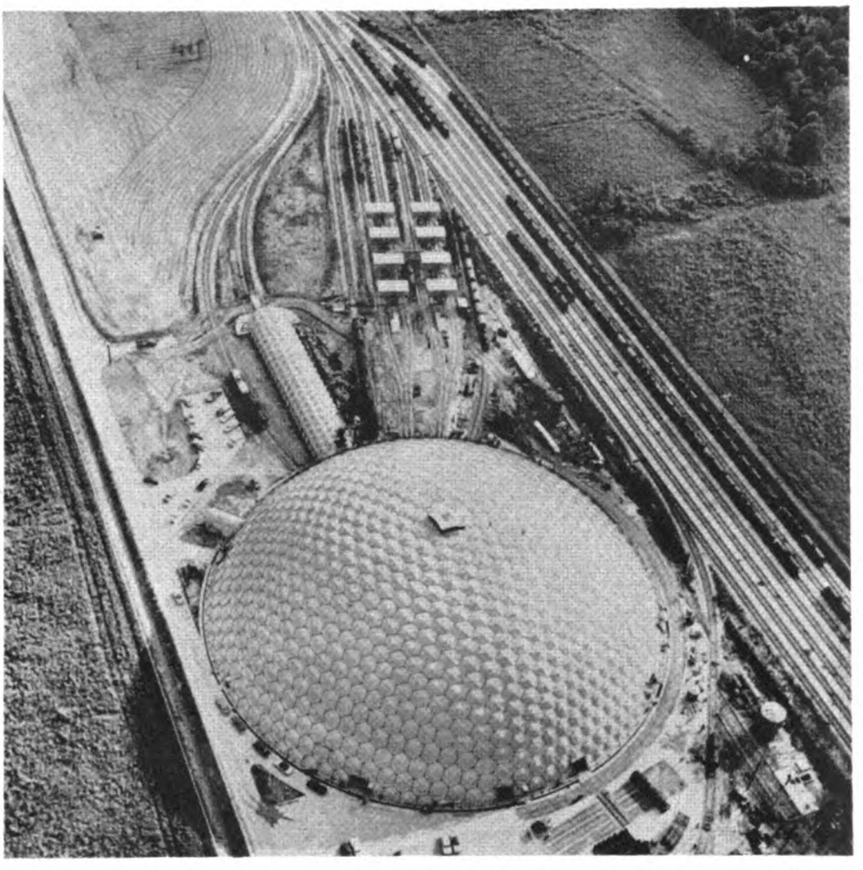
Solid Bearings

Right for Railroads
...in performance...in cost

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**

nion Tank Builds Circular Car Shop

Series of radial track work stations are housed in huge geodesic dome



Dome exterior is painted yellow with tubular truss above these steel hexagons painted royal blue. Plant is designed to repair 200 cars per month. New cars can be assembled here.

JNION TANK CAR COMPANY "had lo this," as E. W. Locke, president, lained it. "This" is simultaneously a l new concept for car shop layout the unique structure in which the ɔle set-up has been housed. Just now new tank car repair shop is going) full operation at Baton Rouge, La. will be making repairs to approxi-tely 200 tank cars per month. Al-dy a second "Union Dome" with the ıe interior arrangement is under con-ıction at Wood River, Ill., to replace C's present, outmoded, conventional shop there. According to the UTC sident, all important shops will be laced in the same way over the next years.

The very nature of tank car operation h its diversity of car types and the essity for making individual and spe-repairs to each car which comes to shop of the type at Baton Rogue kes a straight production repair line economical. Even before Union Tank l adopted the Union Dome structure, ıad been decided to lay the new car ıp out as a modern-day variation of the traditional steam locomotive round-house.

High labor costs and the man-hours involved in handling and distributing materials and tools are such that every phase of the new shop design was aimed at moving the cars to work stations and having these arranged for maximum efficiency. Car repairs will be going ahead on one track while a car is being moved into the next. When the work is completed on the first track, the men move to the second. In almost every case, each track has a complete set of utility outlets, electrical receptacles and many tools. R. H. Lehr, plant manager, explains that it is cheapest to keep cars waiting and utilize all other facilities and the manpower full time if possible.

Union Dome

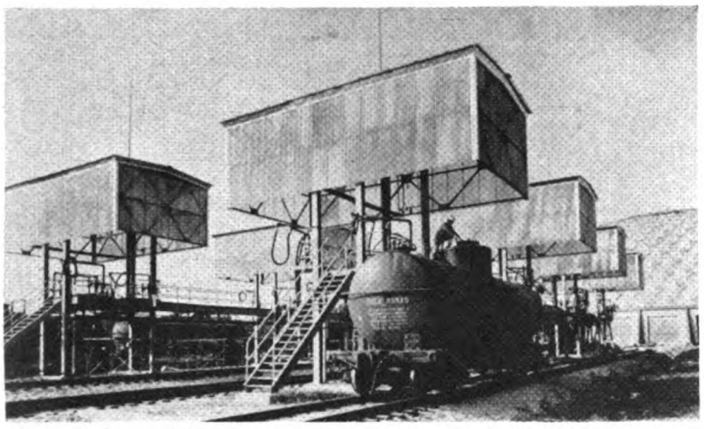
The Union Dome is the largest circular building (384-ft diameter) in the world without internal supports, and is the first geodesic and all-welded dome fabricated entirely of steel.

For the first time, all tank car repair operations have been put under one roof. As a car approaches the Dome, its exterior is cleaned at the *wash area* near the exit of the Paint Tunnel. If the car has carried liquefied petroleum gas or acid, it is cleaned at the special LPG rack. Upon entering the Dome, the car is inspected to determine what repairs are needed.

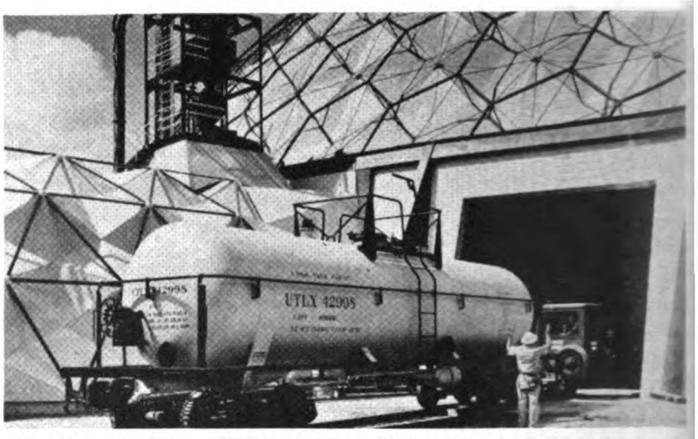
The car is taken aboard the transfer table and delivered to the assigned repair track position. All repairs to the tank car are made inside the Dome. The car may be moved from station to station via the transfer table through various repair stages.

When completed, the car is sent out on one of the three exit tracks. One track returns it to the storage area. A second outgoing track returns it to service. The third outgoing track leads through the Paint Tunnel, for those cars which need to be painted and stencilled.

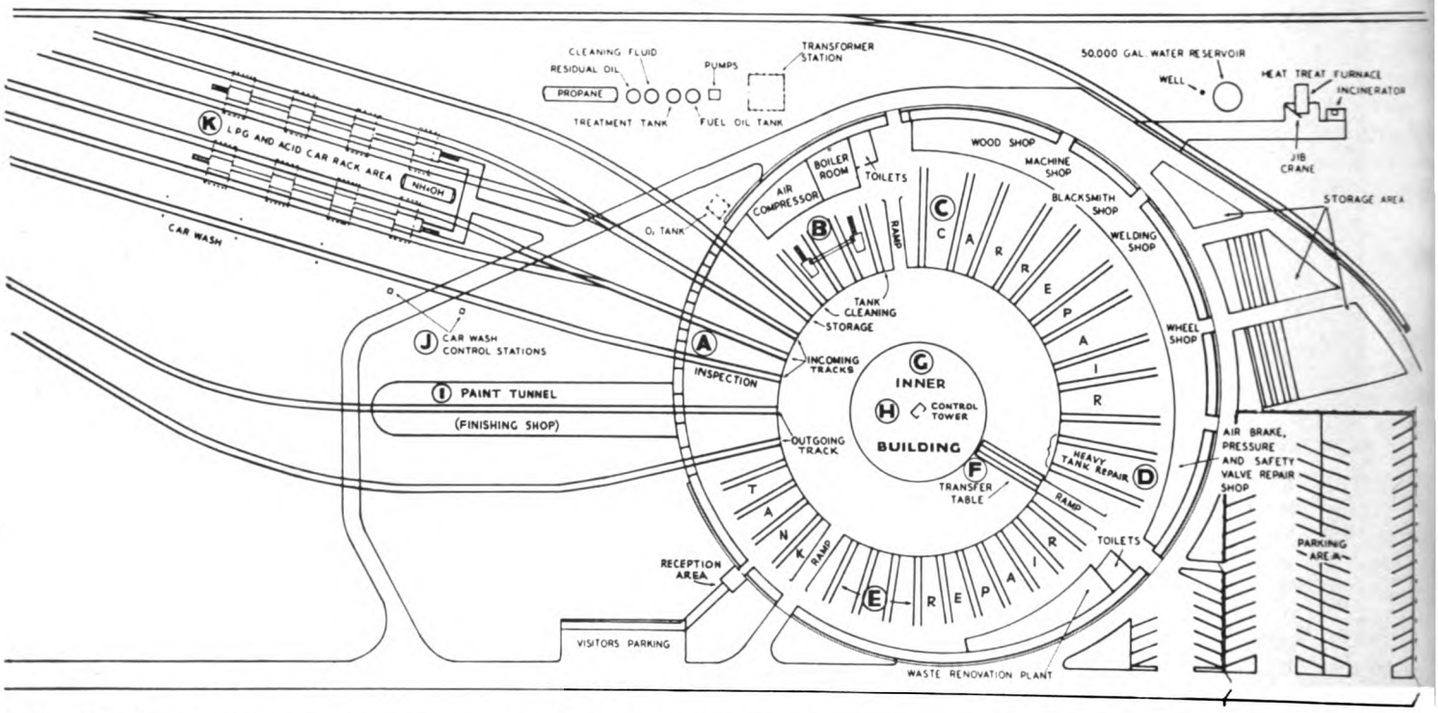
Inside the Union Dome are 36 individual specialized repair track positions, corresponding to the spokes of a giant wheel. These include four tracks for tank cleaning; ten for car repair; two



Cars assigned to LPG or acid service are cleaned with high pressure steam and special solutions before entering shop. On another entry track are spray nozzles which clean the exteriors of all cars.

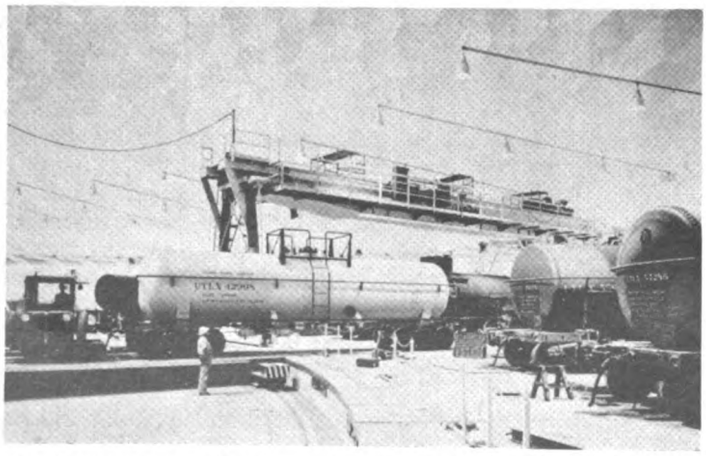


Switching of entire plant is done by Whiting Trackmobile here moving completed car out of shop. Dust collector at back is part of the Vacublast cleaning room at entrance to the "paint tunnel".

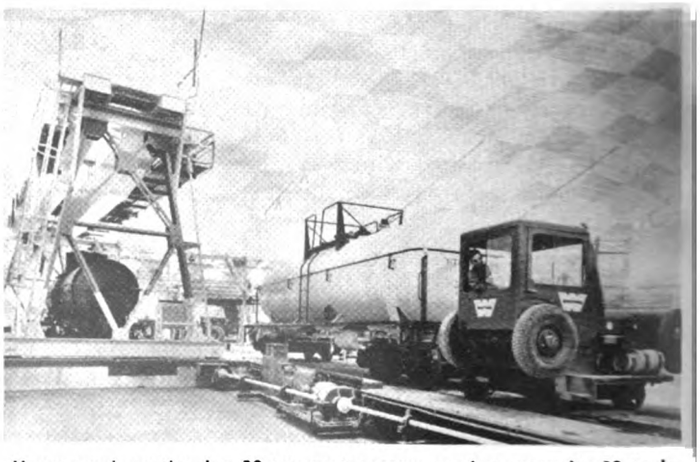


Track plan and maintenance and repair stations include:

(A) Inspection station for tank cars entering the Union Dome.
(B) Four tracks where insides of the tanks are cleaned.
(C) Ten tracks for general repair.
(D) Two tracks for heavy tank repairs.
(E) Fourteen tracks for general tank repairs.
(F) Transfer table.
(G) Inner building for materials storage and offices.
(H) Control tower, at top of Inner Building.
(I) Paint tunnel or "finishing" shop.
(J) External Car wash stations.
(K) LPG rack for special interior cleaning.



Transfer table serving 36 radial tracks moves in circular path around 100-ft diameter structure at center of shop. Combined with incandescent and fluorescent fixtures over tracks are indirect lights.



Heavy repair section has 30-ton gantry crane running across its 10 tracks. Each individual track has small gantry running along it. These small gantries have three hoists for truck dismantling.

vy tank repair; and 14 for tank There are three incoming tracks, ıg one for inspection; and three ıg tracks, including one which ut through the paint tunnel. Each track holds one car. A Whiting r table, which also accommodates e car, moves in a circular course a circular interior dome struc- ı a path 50 ft wide. It delivers ık cars to the various repair s.

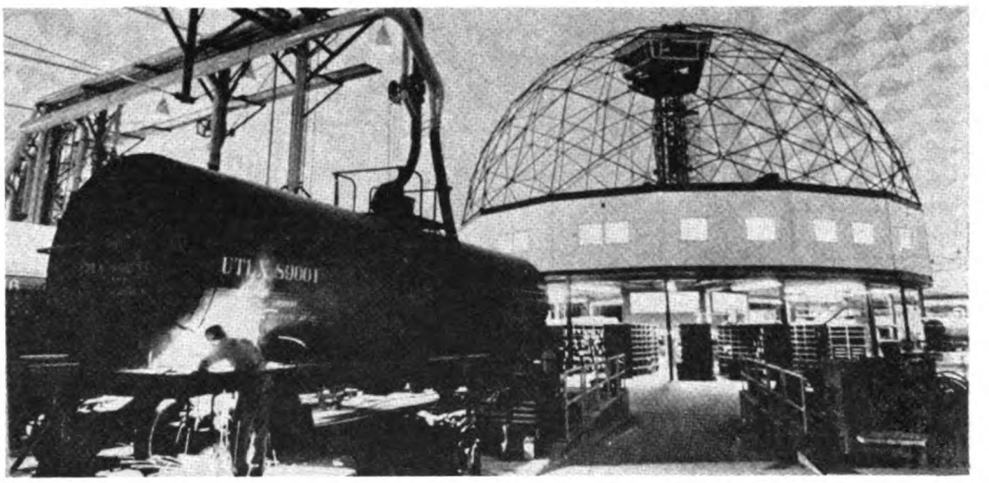
second geodesic-type structure, high and 100 ft in diameter is 25 ft off center of the main but forms the hub of the giant ike arrangement of tracks and areas. A control tower at the top interior structure provides visual of all areas. Thirty-three tele- stations place a telephone within teps of every location in the plant. 2,160 ft of repair track with all areas are located within 50 ft materials storage area on the floor of the center structure.

›r Structure

interior structure is made of steel ›ncrete block and rises 80 ft to -enclosed control tower. It has a er of 100 ft—encompassing 7,500 ›f floor area.

the ground level is an area for ıls storage. At a level nine ft above ›rage area is an open-deck mez- and an enclosed office for store- supervisory personnel and the extensive telephone dial system. ain floor of the interior structure 't above the ground level. It pro- ;eneral administrative offices, a re- ı room and employees' dining, and shower facilities.

glass-enclosed control tower is rve center of the tank car repair ions. It is the headquarters of the

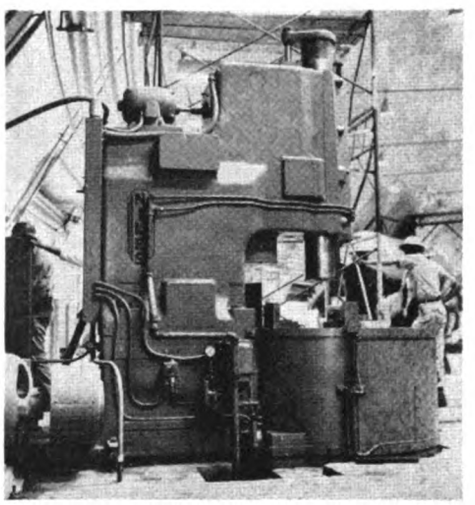


Control tower at top of central structure is 80 ft over shop floor. Control of all operations and of material flow is handled from here. Stores facilities are at base of this structure and offices on 2nd floor.

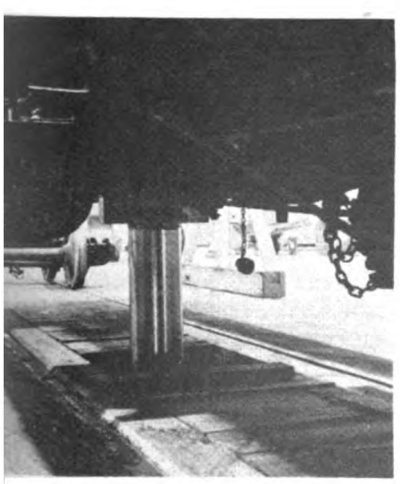
work-coordinator who is in touch with the inspection area and all tank car repair stations by telephone. Around the office inside the tower is a desk-height shelf divided into sections that correspond to those tracks directly below. By marking on the thick plastic surface of the shelf with a grease pencil, the work-coordinator keeps record of the status of work on each track. Changes in the notations are made by simple erasure.

Tank car inspectors relay the work that must be done to the work-coordinator, who in turn enters this information in a Friden Flexowriter Programatic system. The Friden machine has been adapted especially for car repair work, and is used by the work coordinator to maintain automatic programming, control and records of all repair operations, and order material from stores area.

The Whiting transfer table is the key to the movement of cars in Union Dome's radial track plan. It carries only one tank car at a time, and travels on a circular course 50 ft wide around the interior structure. Tank cars are moved onto the transfer table by a Trackmobile. The driver of the Trackmobile operates the transfer table from his driver's seat.

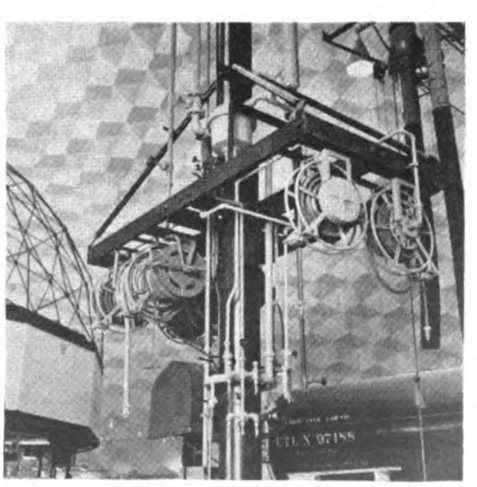


Niles car wheel borer is combined with Sellers axle and journal lathe, and 600-ton wheel press to produce compact wheel shop in one section of crescent-shaped area back of the car repair tracks. Shop steam is supplied by two Cleaver Brooks generators and compressed air is produced by Ingersoll Rand Type LXE compressor.



ɛ 9-ton Autoquip jacks mounted between re used for lifting cars. Jack bears on ame just back of the bolster.

Skid-mounted Lincoln rectifier welders are moved in shop by lift truck. Special shop trucks handle journal packing and the packing tools.



Retractable Ace hose and cable reels are located at each work station. Aim was to keep all hoses and cables off the shop floor.

Paint Tunnel

The Paint Tunnel connects to the main dome, and is 200 ft long, 40 ft wide and 20 ft high. It covers one of the outgoing tracks and is the last stop for those cars requiring painting and stencilling. A special Vacublast grit-blasting unit prepares the cars for painting.

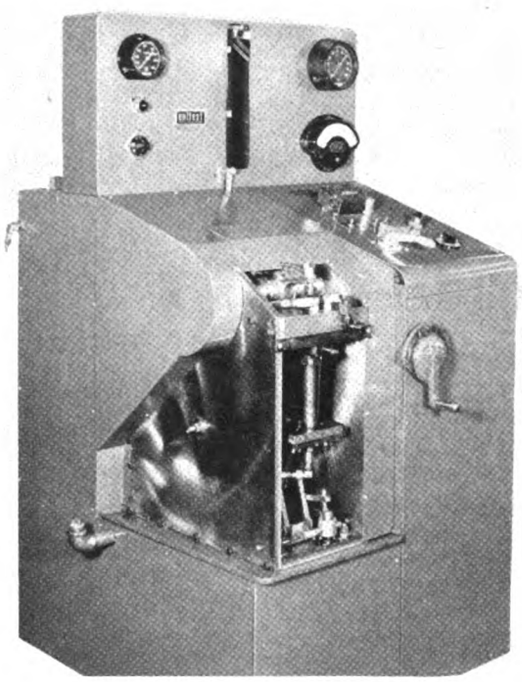
The next step is a pre-heated oven for controlled and quicker drying of the paint. At the paint area workers on both sides of the track have scaffold elevators which move up, down or sideways. Paint is applied at temperatures ranging between 130 and 160 deg F. The last stop in the paint tunnel is for stencilling, an operation which has been greatly facilitated by the use of magnets and a photographic slide projector. The overall operation in the paint tunnel can be done in two to three hour

The Union Dome consists o hexagonal steel panels welded to and strengthened on the outside interlocking system of rods and There are 12 slightly different and sizes of panels, averaging mately 30 ft across.

In technical language, the Do approximately a one quarter spher

(*Continued on Page 62*)

More Accurate Calibration for Fuel Injectors?



FUEL INJECTORS are the "heart" of the diesel engine, and present methods of checking overhauled injectors may not tell everything about how they will actually perform in service. In general, the hand-operated test device, now widely used, does permit observation of the spray pattern and checks the "pop" or opening pressure. It does not give a check of the quantity of fuel delivered. There is no "run-in" or "settling down" of valve alignment in relation to the pressure spring to assure proper seating. This may cause some initial fuel leakage when injectors are installed and the engine first placed in operation.

As a matter of fact, a recent accurate calibration of injectors overhauled and hand tested by the usual methods at a western railroad shop showed variations of as much as 10 per cent in fuel delivery by individual injectors at full load, 50 per cent when idling, and a leak-off four times as much as one injector as on several of the others. The device used for this test was the Unitest U-8500 comparative calibrator which has been developed by the Diesel Control Corporation, Wilmington, Calif., especially for checking GM Electro-Motive and Cleveland diesel fuel injectors.

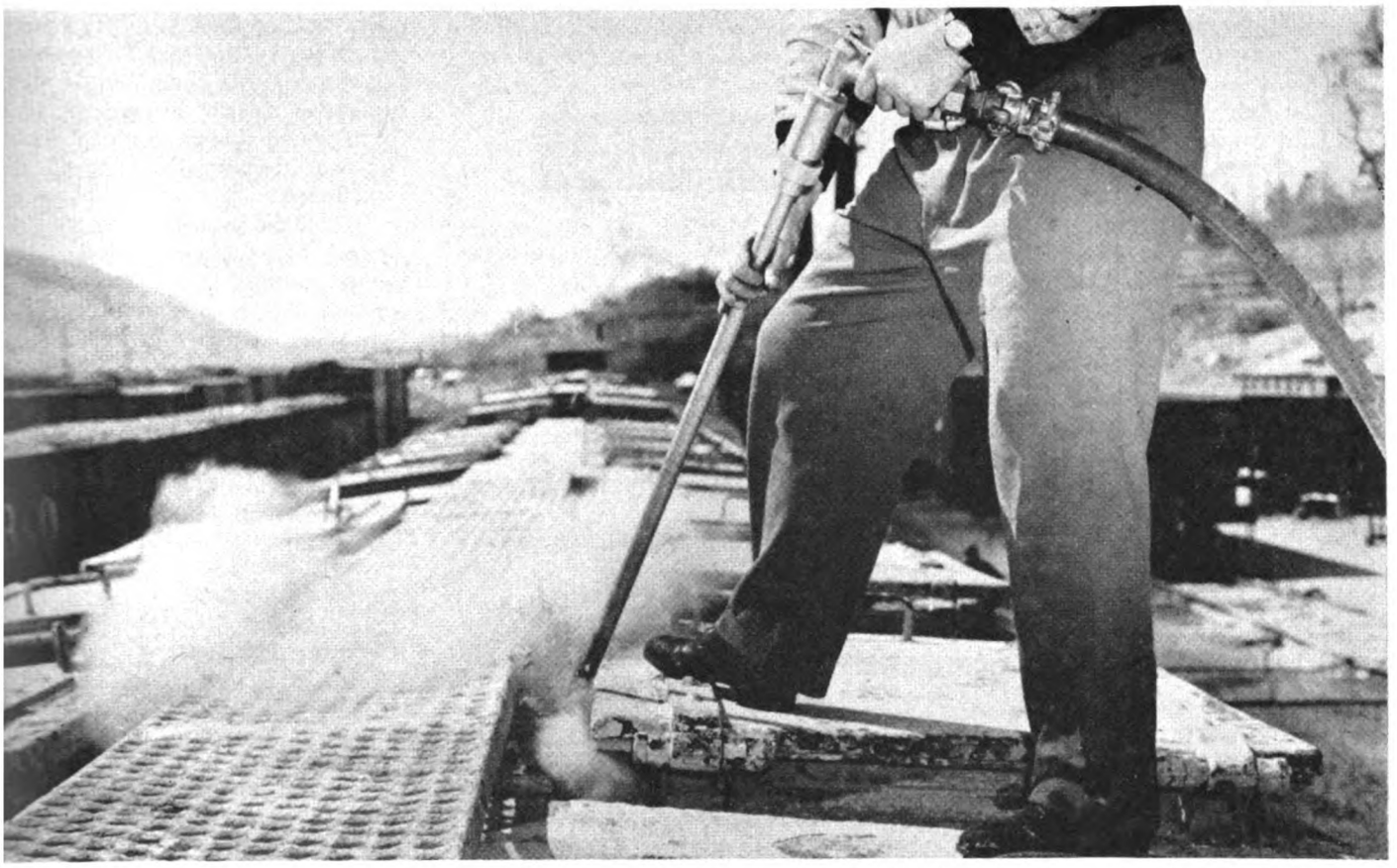
The tester simulates the operation of an injector in a diesel engine by holding it in operating position from a bearing point on the assembly sleeve, and compressing the injector as it is when installed in the engine. A standard Model 567 rocker arm and cam contour are used. The speed (operating range) is from 250 to 900 rpm. The temperature of the calibrating oil is controlled and the oil is circulated at a constant pressure.

To assure accuracy in the machine there is a flywheel with sufficie ertia to maintain a steady plunger travel. The stroke (regulating the number of injecti charged to the measuring gradu exact; the graduate which colle jector discharge is of com accuracy; and the dumping a time-controlled in order that the from "wet glass" will remain co

A volumetric check of actu delivery, under controlled con shows whether or not: (1) each s the injector under test will deliv in quantities compatible with oth jectors repaired by the same m (2) all parts of the assembled in are in satisfactory operating con and that incorrect parts are n stalled; and (3) used parts, visua spected, are satisfactory for co use. In addition to this proof th final assembly of an overhauled i is correct and satisfactory and dirt remains in the injector. T jector is "run-in" and condition perform immediately and satis when applied to an engine.

Considerable use has alread made of this machine in testing in used by railroads. Such items a age across flat surfaces, sticky p and barrel assemblies, and overs are easily detected. The machine effect a *Go—No Go* gage for f jector repair work.

Present testing time with the U machine is under 6 min. per injec run a calibrating check involvi speeds and two rack settings, b time may be reduced when more experience has been gained w larger number of units. Improved engine performance, fuel savings a duced maintenance are strongly dicated by the use of this calib machine which gives a positive ch the quality of injector repair wo thus assures more equal delivery to each cylinder of a diesel engine



Accumulations of cement on the roofs and running boards of cement cars increase the light weight, make the hatches difficult to operate and close tightly, and frequently result in customer complaints.

ıin It's The Season . . .

Keep Your Covered Hoppers Clean

ILE COVERED HOPPERS have ıused to haul many new types of in recent years (RL&C, October page 24), most of these cars andle cement. In fact, the grow-se of ready-mixed concrete and ıational highway program both to the need for more and more of cars in the years ahead. Increas-umbers of the cement industry's ners want their cement by the carload rather than in individual

ıat does this mean to railroad me-cal departments? It means that in-of demanding box cars with tight and reasonably smooth interiors, shippers now place the emphais ɔvered hoppers with hatches and ts in good working order, and with and interiors free of any build-up ied cement.

ɛcumulations of cement increase the of a car between the mandatory veight periods and are frequently the source of arguments with shippers. Present day cement specifications are much more rigid than was formerly the case. Customers will not have cement of one specification contaminated by the material remaining in the car from a previous load.

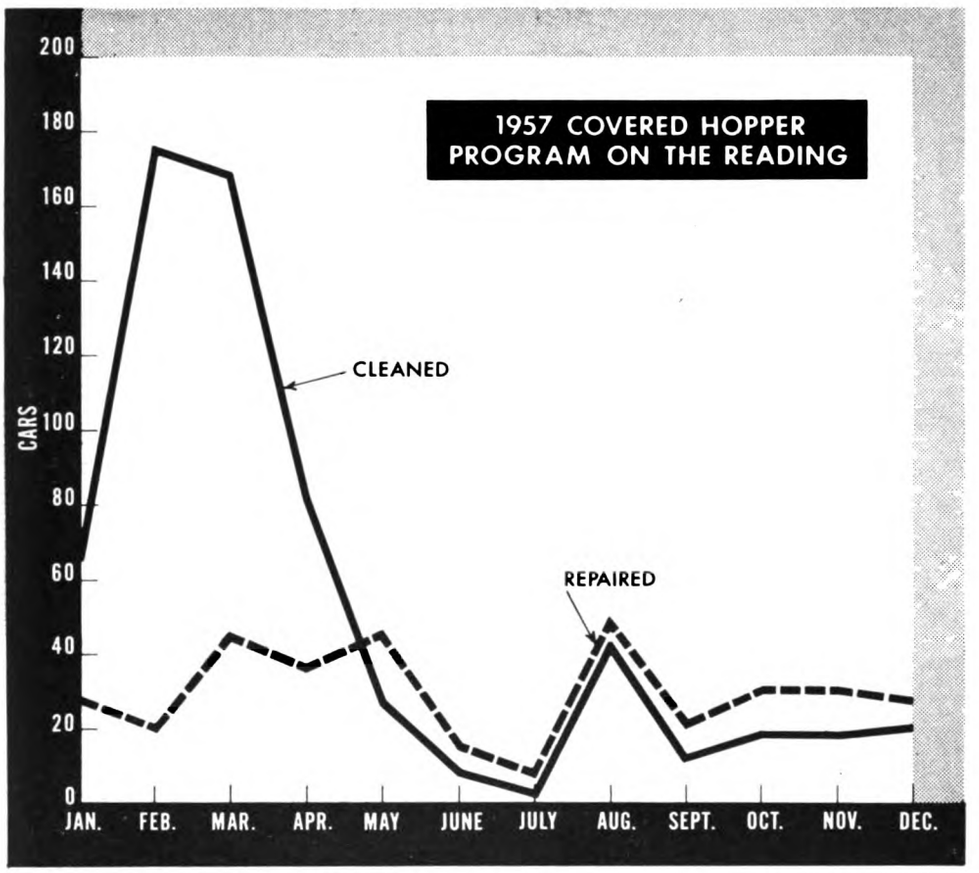
Most mechanical men are quick to point out that accumulations of cement, least on the roofs of cars, could be kept down if the men who load the cars would blow or sweep the roofs after loading is completed. But that idea in practice is about as effective as those for getting consignees to remove dunnage or replace DF loader bars after unloading a car. The problem gets back to the mechanical department and probably can be approached from two angles:

- Can covered hoppers be designed or coated so that cement will not build up?
- What is the most efficient way to remove accumulations of dried cement?

Railway Locomotives and Cars surveyed most of the major cement hauling railroads. On questions of design, most lines agree that the round hatch and cover are vastly superior to the square hatch used on earlier cars. As one SMP put it, "With the square hatch and cover, the cement would more or less stay on the top of the car, and become caked . . . With the round hatch and cover, it is more likely to be blown away when the car is in motion, and not cake."

This circular hatch is endorsed by one of the nation's big cement shippers with the statement that there is less spillage in loading and that these covers stay tighter. One railroad reported that its specifications for covered hopper cars are prepared "in an effort to reduce edges, corners, and ledges to keep the build-up to a minimum." This road's cars are to have round hatches, inside seams, raised running boards, rounded eaves, and as few sharp corners and fillets as possible.

Some railroads have been experi-



Cement car cleaning program of the Reading is concentrated in the winter months as shown by the road's 1957 figures. All these cars are cleaned on an outside track at the Reading, Pa. shop.

menting with a wax coating on the interiors of covered hoppers and others with a plastic material to keep the cement from adhering to the car. One road has been testing a plastic coating for the roofs. It is the intention that this material would be stripped off once the roof had become coated with cement. One road reported on the coating of the interior of a car, but said that the procedure was "quite expensive" and that the car was subsequently assigned to salt service.

Archer-Daniels-Midland reports that its ADM Freight Liner 610, a strippable plastic coating, is being marketed to railroads following a year and a half of testing on the Clinchfield. The material is a one-coat sprayable plastic with good alkali and weather resistance. It does not require a catalyst but dries by solvent action. According to ADM, the Union Pacific, Santa Fe, Great Northern, Frisco, Wabash, Pennsylvania, Soo, and Texas & New Orleans also are using the material.

ADM Freight Liner 410, a material used previously for coating the interiors of food products cars, is being tested by the Frisco as a permanent coating for cement cars. The material's resistance to abrasion, moisture, and chemicals is expected to produce a smooth, fast-unloading, easily cleaned, surface to which cement will not adhere.

Cleaning Schedules

The ultimate in cleaning methods was probably achieved a few years ago when one shop track attempted to loosen crusted cement from the interior of a covered hopper with dynamite. The car came off second best, and more conventional cleaning methods again became the standard at that shop.

Even these "more conventional" methods vary from road to road. Costs probably don't, and run from $25 to $50 per car. This varies not only because different methods are used but also because some cars are operated for longer periods between cleanings.

Both costs and timing were mentioned by one mechanical superintendent who reported that "we have no specific program set up for cleaning these cars. It is a terrifically expensive operation and, consequently it is performed only when it is absolutely necessary."

Another approach was reported by W. E. Lehr, superintendent of motive power, Lehigh Valley. "We have set up an inspection program for our inspectors at interchange and intermediate points to check these cars for cement accumulation and to see that the hopper doors are in operating condition. Periodically, these cars are sent to our Packerton Shop where the caked cement is completely removed, and loose cement cleaned from both the outs... the inside of the car. There have a number of complaints abou... weight of the car affected by the ... cement and this is another reason we have to bring the cars to the ... regularly.

"We have established a regular ... gram," Mr. Lehr continued, dur... winter months when the dem... cement cars is at a minimum ... all these cars into our Packert... for cleaning. After this, they are ... awaiting the opening of the ... season in the spring."

Another road reported th... covered hoppers are cleaned as ... weighed every second year. This ... dure is said to permit an annual pr... without taking too many cars ... service at one time.

Cleaning Methods

Sandblast and chipping hammer ... generally conceded to be the ... effective ways to remove the stub... deposits of cement which accumul... covered hoppers. F. J. Black ... visor of motive power and equip... Northampton & Bath, reported th... road does two types of cleaning ... is a complete strip-down job ... all the paint is revoved and the ca... painted. The other is a cleaning o... accumulated cement on the roof o... car, the repairing of the hatch an... and the cleaning and repairing o... hopper doors.

"In the complete strip-down," Black went on, "the metal ru... boards are removed and the car is ... blasted with a Pangborn Sand Bl... The car is cleaned down to the ... metal both inside and out, and the ... repainted. The other cleaning ha... the removal of rough cement whic... cumulates on the roof. This is ... with chipping hammers and by h... This is a rough type of work and ... mostly to bring the car back ... marked light weight. Our ca... cleaned for light weight by the ... method when inspection shows it ... sary."

The Lehigh Valley, Jersey Centra... Reading all report the use of a d... known as the Airnesco Pulsair pu... sion generator which "is small en... to be used as an air gun". W E ... of the Lehigh Valley reported th... Airnesco unit has been found ... and entirely satisfactory for cle... the car—saving time and labor ... pared with the old method of chi... off cement with hammer, chisel ... bar."

The Jersey Central stated th... latest Airnesco unit "can be use...

ection for sandblasting. The sand- thoroughly cleans the car to te the welding of small cracks." rsey Central has a special air line track in the Allentown, Pa., yard makes it convenient for em- to work on the roofs. The co machine does a very good job ening the hard, caked substance t damaging the roof sheets or covers."

the Reading, W. A. W. Fister, ntendent of motive power and equipment, says the Pulsair gun aterially speeded up the cement eaning program. "However, its is greatest as a supplementary tool oes not handle all the cleaning re- —especially in the areas around the hatches where the build-up is the greatest and appears to be the most tenacious.

"In these areas, we are required to loosen this build-up or incrustation with an air hammer and then use the Pulsair gun to remove the residue," Mr. Fister explained. "Once the pulsing air can get under the material, it will remove it very quickly. The biggest time and labor saving with the gun is in the cleaning of inside surfaces which previously was done by hand. It formerly required ladders and scaffolding inside the car. With an extension, the Pulsair gun removes 90 to 95 per cent of the cement on the inside from the outside through the hatches."

The growing popularity of covered hoppers for transporting industrial chemicals, grain, and other materials frequently makes it necessary to clean cars twice a year. A number of roads have found that cars used for cement service in the summer can be assigned to other services during the winter. One line reports that, in addition to all mechanical methods, hand cleaning and water pressure will be required for such a complete cleaning of this type.

Whether used exclusively in cement service or not, the cleaning of these cars continues to be a vexing problem for car department officers. Design can help some, but at the moment efficient cleaning tools are the most obvious answer. In any case, cost will continue to be high.

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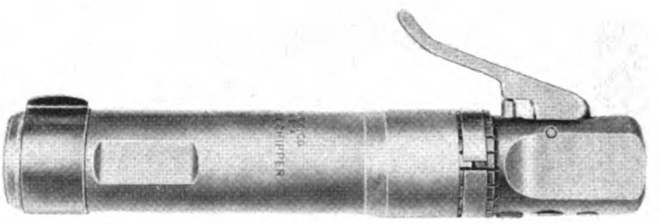
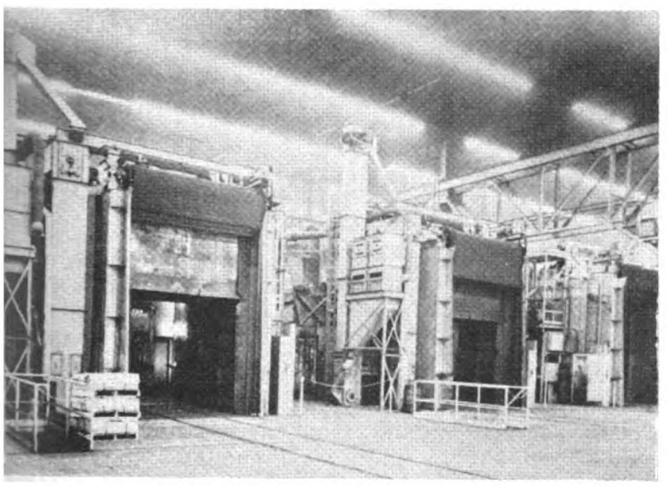
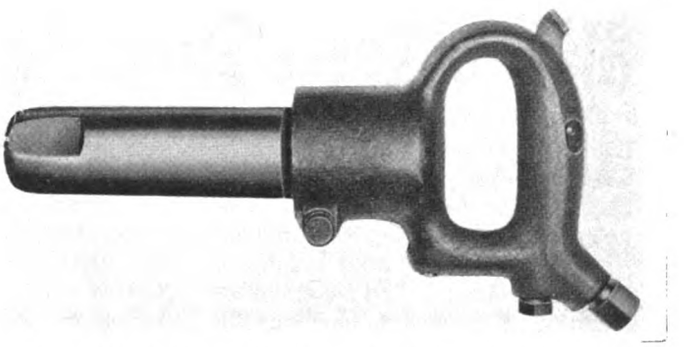
se Devices ht Solve r Cleaning Problems



Chipper, Chicago Pneumatic Model CP-455-L, is equipped with jet for cleaning work surfaces. The manufacturer recommends that it be used with Heavy-blade Chisel 70982 for removing stubborn cement deposits.

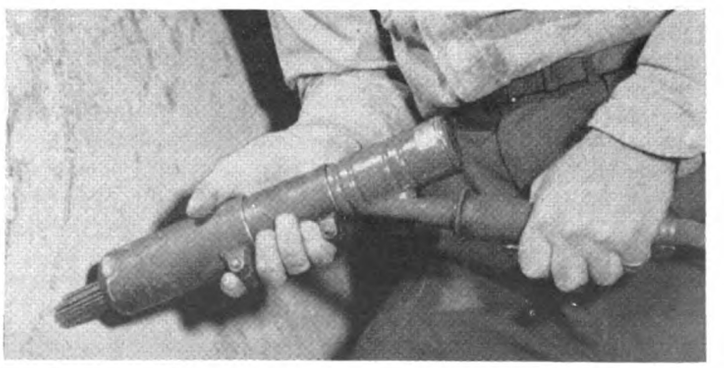


s centrifugal Rotoblast cleaning rooms are recommended by Pangborn for car cleaning. This company also makes airblast equipment which be used for interior cleaning.

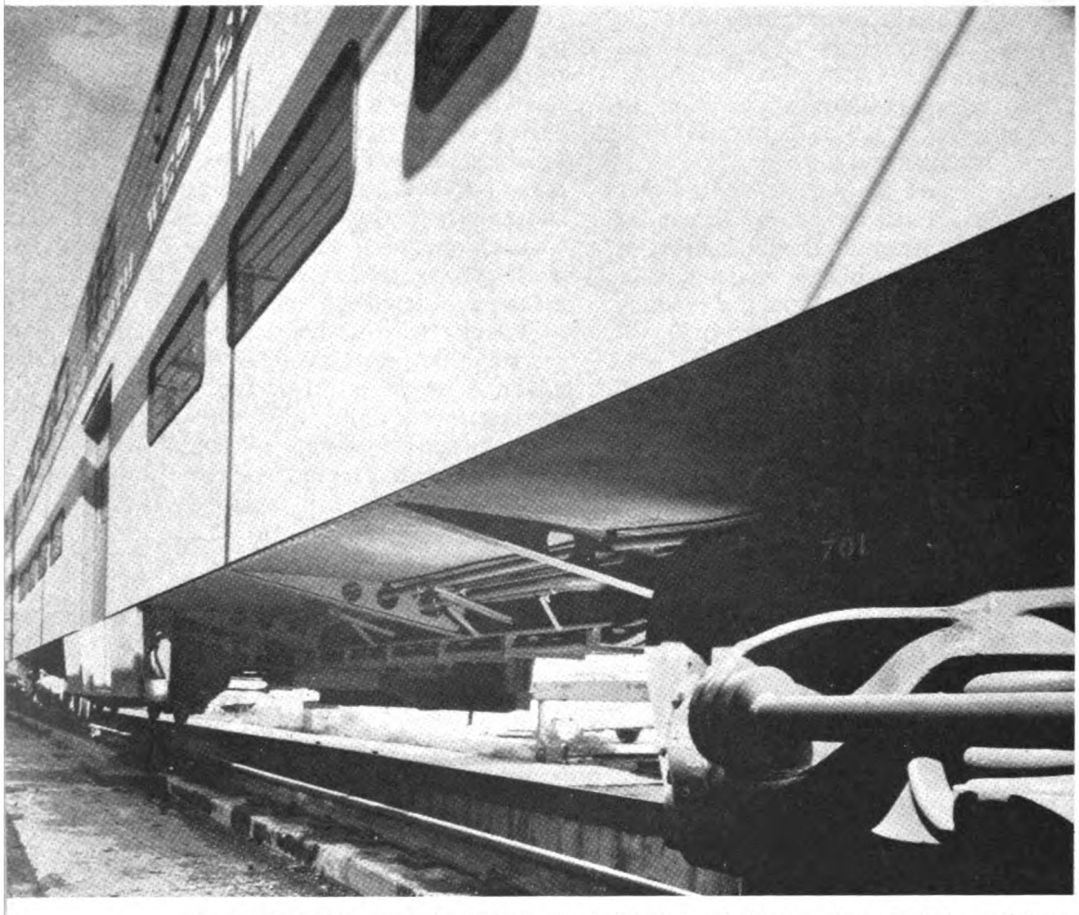


Chipping and scaling hammers, such as this unit produced by Gardner Denver Co. do fast thorough cleaning job on covered hoppers according to the manufacturer.

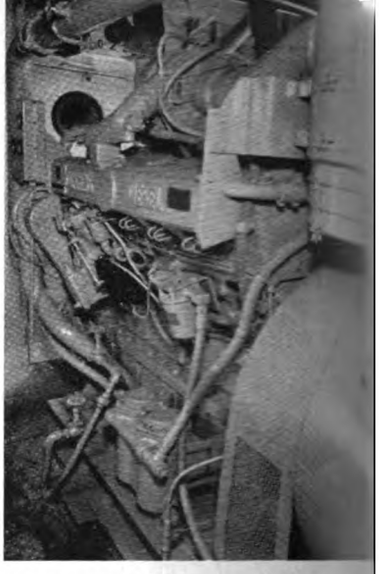
sco percussion cleaning system, made by L. C. Nesham Products, des Pulsair gun whch can be used as sandblasting equipment with changeable parts available.



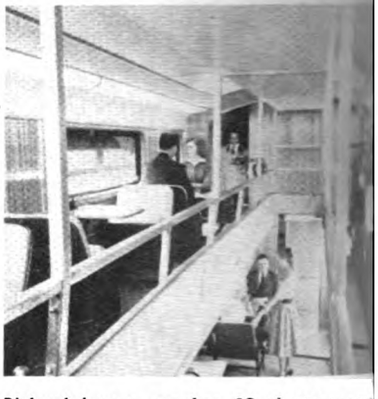
Von Arx pistol, sold by Marindus Co., has battery of hardened steel needles which are forced against even irregular surfaces to remove residual cement which air exhaust clears from work area.



Head-end electric power for heating, air-conditioning and lighting, plus unit brakes, eliminates under-car generators, piping and rigging.



Alternator installation on this diesel loco added only 6,200 lb to locomotive weight.



Bi-level lounge car has 13 theatre-type seats small tables on the upper level.

C&NW Bi-Level Streamliners Are In Service

TWO NEW CHICAGO & NORTH WESTERN streamliners, just going into service, are the first bi-level trains in America for through service. Interesting car designs have been combined with other mechanical and electrical innovations on these trains. For $2,500,000, Pullman-Standard constructed 13 new cars of the bi-level design and remanufactured four conventional cars to conform in exterior appearance with the new cars.

The 85-ft bi-levels have the same structures and center vestibule entrances as the 48 double-deck suburban cars the C&NW already has in service. In fact, these new cars could rapidly be converted for suburban service, if that ever becomes necessary. "This new design," according to Pullman-Standard president J. W. Scallan, "represents a giant step forward in the reduction of weight and cost in passenger equipment with no sacrifice in comfort or spaciousness."

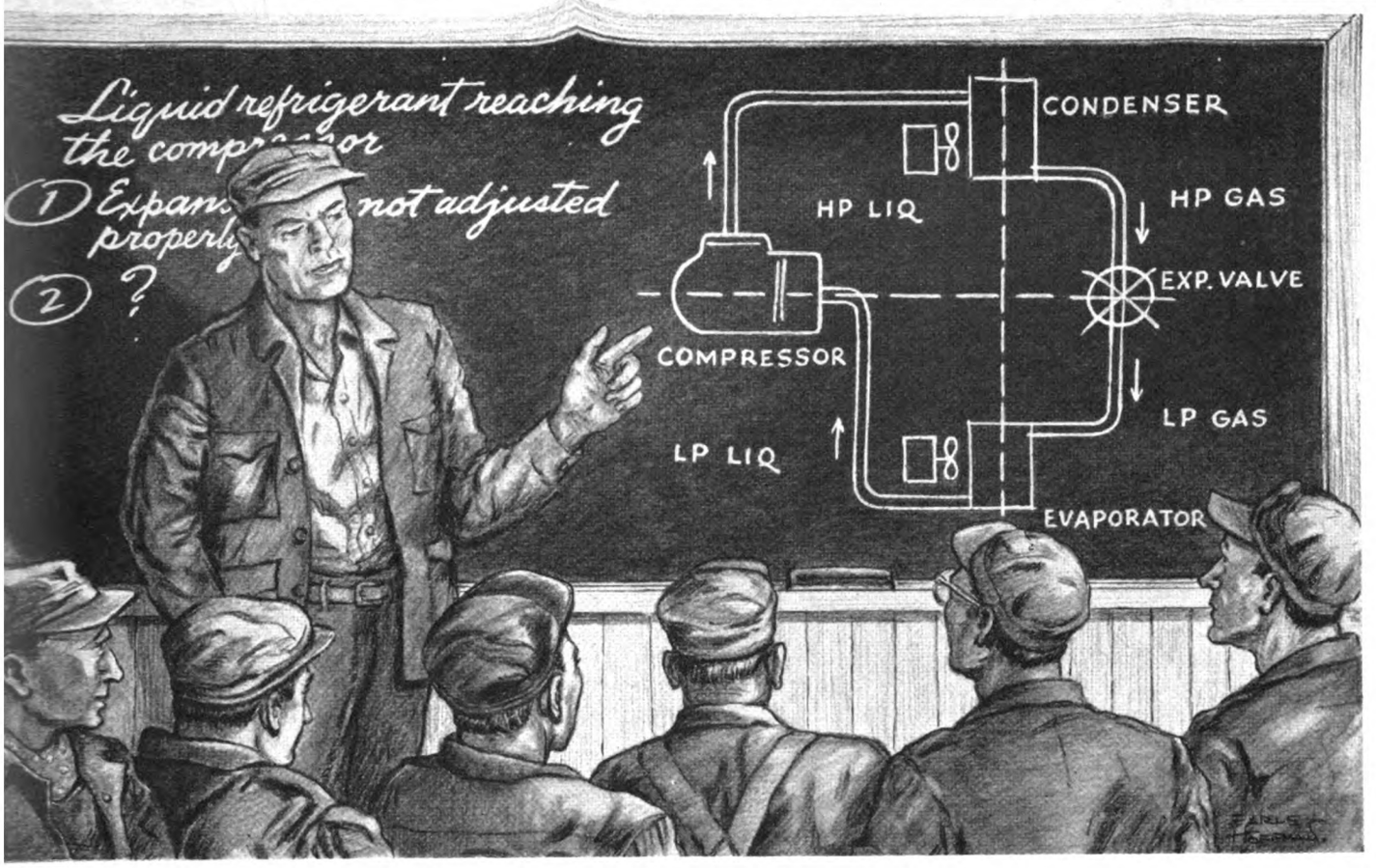
Ten of the new cars are 96-seat coaches with 16 seats on each of the two upper levels and 32 on each of the two lower levels which are separated by the center entrances. These coaches weigh only 1,302 lb per passenger seat —a figure competitive with some of the lightweight trains put in service in recent years. In addition to the 10 bi-level coaches, there is one bi-level, 60-passenger parlor car; one bi-level, 78-passenger coach-parlor car; and one bi-level, 80-passenger coach-bar-lounge car. The remanufactured single-level cars include one baggage-tap car, one baggage-ROP-tap car, and two diners. These remanufactured cars had their roofs raised to 15-ft 10-in. above the rail to conform with the profiles of the bi-levels.

The power for the new trains is to be supplied from the locomotives—an arrangement which gained popularity during the most recent lightweight train era. The C&NW shops have converted six locomotives for this. Four GM E-8's and two F-7's have each been equipped with a 575-hp Cummins engine, driving a 300-kw, 480-volt, 3-phase Marathon alternator. Power from any two of these locomotive units is sufficient to power the longest of the level trains. On the E-8's, the steam generator and most of the associated wiring and piping were removed. The diesel and alternator which were installed are skid-mounted to facilitate removal.

On the E-8's, the boiler water system was connected with the 1,100-gal. fuel tank and the new fuel storage system has a total capacity of 2,200 gal. Fuel consumption of one of the auxiliary engines at full load is 35 gal per hr. Locomotive weight is increased by 6,200 lb with this all-electric power supply equipment.

Automatic equipment for the paralleling of two or more alternators is installed on each locomotive. The three-phase a-c train line through the cars makes possible the use of some commercial electrical equipment such as water coolers, water heaters, and fluorescent lights. Resistance-type units located along the side walls and in the

(*Continued on page 64*)



"But still liquid refrigerant is reaching the compressor"

rosty But Not Freezing

By Ken Wright

NE MORNING, the gang gathered he room used for the mechanical gerator car discussions. Pete, our nbling friend (who forgets to grum- when teaching), was the instructor. Jim, the boss, sat in on these class ions whenever possible.

Fellows," Pete started off, "I had interesting situation last week. I'd to share it with you. This car FGE 0, was reported not cooling. Now ou will take the list of cars we ked out during our last session, you see that this car falls in the series FGE 1220 to 1600. Each of these quipped with a 2-71 Detroit Diesel ine, Frigidaire dual refrigeration sys-, and an Allen Bradley DRC-15 elec-al panel.

Knowing this before I reached the , gave me some ideas. When I got re, I found the engine running and normal voltage pilot lamp lit. That l me that the power plant was func-ning properly. Both compressor pilot ips were lighted and the condenser was running. So far, so good. Then ioticed that both of the compressor dies were frosted over. Now, what uld cause that?"

Mike spoke up, "Liquid refrigerant reaching the compressors." "Right!" said Pete. "Let's make a list of things that will cause that. What's first?"

Tony responded, "Expansion valve not adjusted properly."

"Okay," Pete agreed, "What's next?"

No answer.

"Well, lets sketch the basic principles of a refrigeration system," Pete suggested, as he turned to the blackboard. "The basic parts are a compressor, evaporator (boiler), condenser, and an expansion valve. There are other accessories usually added but for right now, we will take only these bare essentials. Let's show them schematically like this.

"Remember now, relatively speaking, the condenser is located outside the car, and the evaporator is inside. The purpose of a refrigeration system is to transfer heat from a location where it isn't wanted to a location where it isn't objectionable. Now, we want to pick up heat at the evaporator and take it around to the condenser and get rid of it there. The heat of the air surrounding the evaporator (generally circulated by a fan), will be absorbed by the liquid refrigerant, causing this refrigerant to boil or evaporate into a gas or vapor.

"This heat-laden gas is drawn off by the suction side of the compressor. It is then compressed and sent on to the condenser at high pressure. The air being blown through and around the condenser removes the heat from this high pressure gas causing it to condense back to a liquid. This liquid leaving the condenser is ready to pass back through the expansion valve and into the evaporator.

"Now notice, if we draw a vertical line through the condenser and evaporator, it will divide the sketch into two sections. To the right of the line is liquid, to the left of the line is gas. Now draw a horizontal line through the compressor and expansion valve. Above the line is high pressure and below the line is low pressure.

"We now have four areas or sections —high pressure gas, high pressure liquid, low pressure liquid and low pressure gas. The first item of the list we started was 'Expansion valve not adjusted properly'. Let's assume for a moment that it is adjusted properly, but still liquid refrigerant is reaching the compressor. Doesn't that mean that heat is not evaporating the refrigerant as it passes through the evaporator?

"Now," Pete asked, "what would keep the heat from reaching the refrigerant in the evaporator?"

"Blower fan not operating."

"Blocked air circulation."

Pete stopped them. "Wait a minute. Let's break that last one down some more. It's too general. What would cause blocked air circulation?"

"Dirty evaporator."

"Iced evaporator."

"The car loaded so that air passage is blocked or so circulating air is short circuited by taking the path of least resistance."

"No, I won't buy all of that." Pete broke in. "Blocked air passages would apply if this car had open circulation, but it is an envelope type car and the lading does not affect air movement. The short circuiting of the air applies to an open circulation car too. I don't believe that this will cause a flooded evaporator which is the technical term for the condition we are discussing.

"That should complete our list. Of the four items, the last one we should worry about is the first on the list—'Expansion valve improperly adjusted'. Very little can go wrong with an expansion valve. If it was adjusted properly and tested when overhauled, it shouldn't get out of adjustment by itself. The circulating blower fan and motor on this car, and on most cars, are enclosed within the loading space and cannot be seen from the machinery compartment. Can any one suggest how we can tell whether it is running or not?"

There was silence for a few moments, and then a big smile came on Mike's face and he answered, "Use a clamp-on ammeter."

"That's right," said Pete. "If current is found in the wire leading to the evaporator fan motor, we can assume that it is running. If the motor was not turning because of mechanical defects, the overload breakers on its contractor would be tripped. That brings us to a dirty or iced evaporator. Which is the most logical one, now that we have determined that the car is an envelope air-distribution car?"

A rather quiet fellow spoke up, "The iced evaporator because little dirt gets in there."

"What will cause an iced evaporator?" queried Pete.

"Equipment not defrosting. There could be something wrong with the defrost timer."

"Almost right," grinned Pete, "But, this car does not defrost on time. It uses a switch that has the fancy name of 'Static Air Pressure Differential Switch.' It is a diaphragm-operated switch with one side of the diaphragm connected into the space above the evaporator and the other side connected to the space below the evaporator. That means that when the evaporator becomes clogged with frost, there will be a difference in the air pressures above and below the evaporator which will be detected by this gadget.

"When this pressure difference is great enough," Pete continued, "the switch will operate and put the equipment into defrost. Any slight leak around the evaporator or in the tubing to the switch, as well as blocked air will prevent the equipment from automatically defrosting. That was the trouble that I found last week. One of the copper tubes to the defrost switch was broken. I knew that it would take me a few minutes to repair the tube and the sooner I defrosted the car.

"I couldn't remove the cover from the switch because sometimes this will disturb a gasket. I might not get a good seal there again. I went to the electric panel. The wiring diagram showed that if I jumpered terminals 9 and 10 the jumper would take the place of the switch. I did, being careful because the line is 220 volts. The equipment went into defrost and I repaired the tubing.

"When the evaporator coil was defrosted, a temperature-operated switch—Klixon—operated and the equipment went back into cooling. It was only a few minutes till the car's temperature began to go down. The whole point is that you should evaluate the cause of the troubles before you tear into something."

As the group broke up, Pete noticed that Big Jim had slipped out somewhere during the class.

"That does it!" he groaned. "Now I'll have to give him that yarn all over again. He always wants all the de-

Brake Adjuster Is Air Powered

THE POWER BRAKE adjuster is a simple little device which saves a large amount of time and labor in adjusting the foundation brake gear of diesel locomotives either when taking up slack or changing brake shoes. This normally is done with a hand wrench and ratchet which turns the adjusting nut only about ⅛ revolution per stroke and thus involves considerable manual effort at each wheel on both sides of a locomotive.

The device, made of salvage materials at the Brooklyn, Ore., shop of the Southern Pacific, consists of a 3⅛-in. hex wrench, set in a hinged frame and driven by a bicycle chain connection to the spindle of a Thor reversible air motor. The motor and hinged wrench are mounted on a light tubular steel frame with convenient handle and three small caster wheels for easy movement alongside the locomotive. The bicycle chain drive gives a 3 to 1 speed reduction from the air motor to the wrench. A hook on the handle supports a coil of light ⅜-in. air hose when it is necessary to move the device any distance about the shop or terminal.

When adjusting brake piston travel, the device is moved to the pair of wheels involved, the hose coupled to the nearest shop air outlet, the hinged hex wrench swung down and applied over the brake adjusting screw nut. A 3-in. wide, U-shaped, steel plate or gauge is applied over the air brake cylinder piston. Air is turned on the motor and the adjusting screw tightened until the brake piston collar just touches the gauge at which time the piston travel is accurately set at 3 in. without further adjustment or measurement.

This procedure is quickly followed at wheels along both sides of the locomotive and takes less than one third of the time formerly required with a hand-operated ratchet.

Power brake adjuster speeds work for SP.

The reversible feature of the device is necessary and a special advantage when changing brake shoes. In this case the brake adjusting screws have to be backed off a considerable distance for brake shoe removal and renewal. Then the slack has to be taken up again to obtain the standard 3-in. piston travel. Despite this double operation, the time and labor saving is even greater than when only brake adjustment is required

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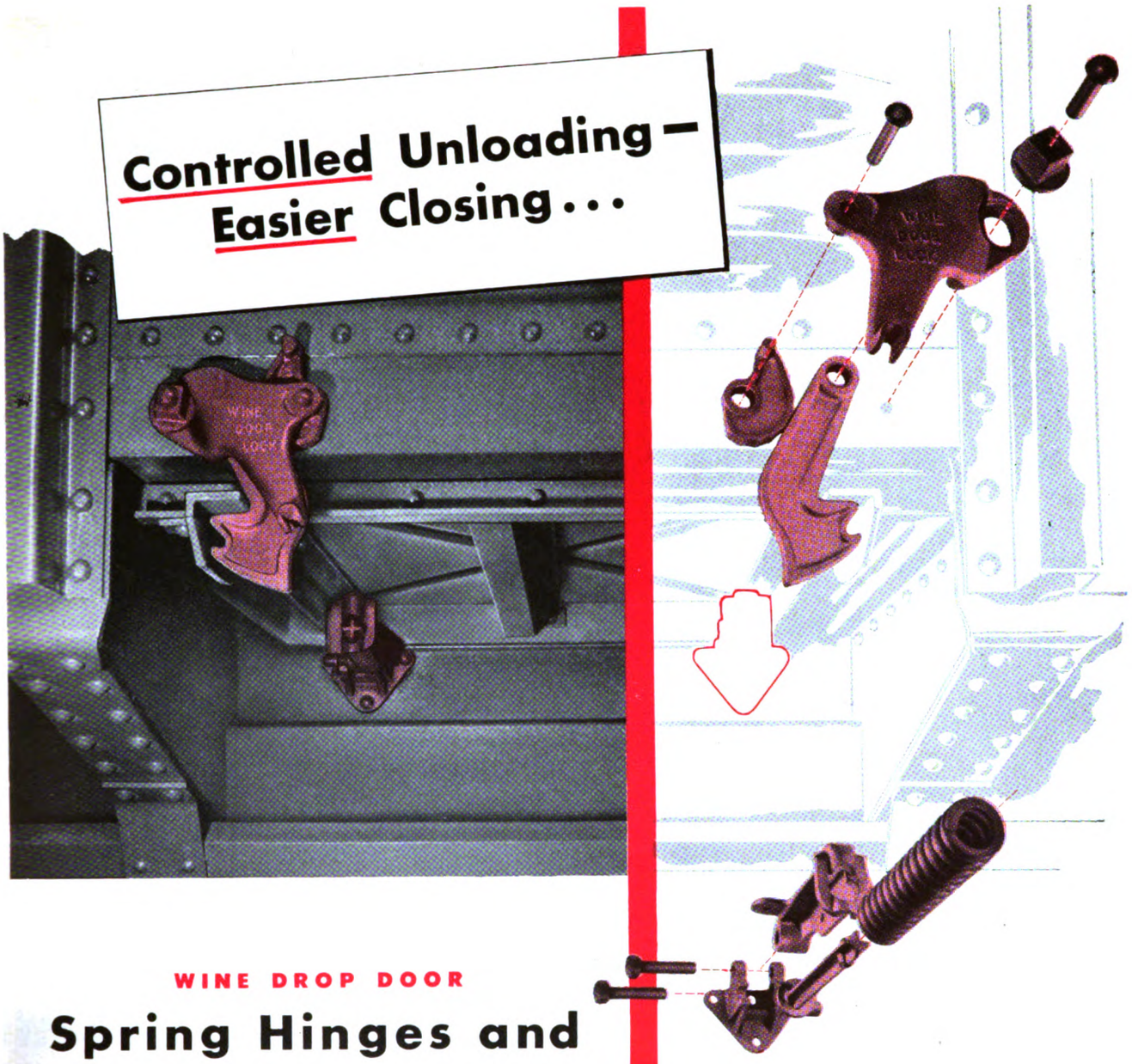

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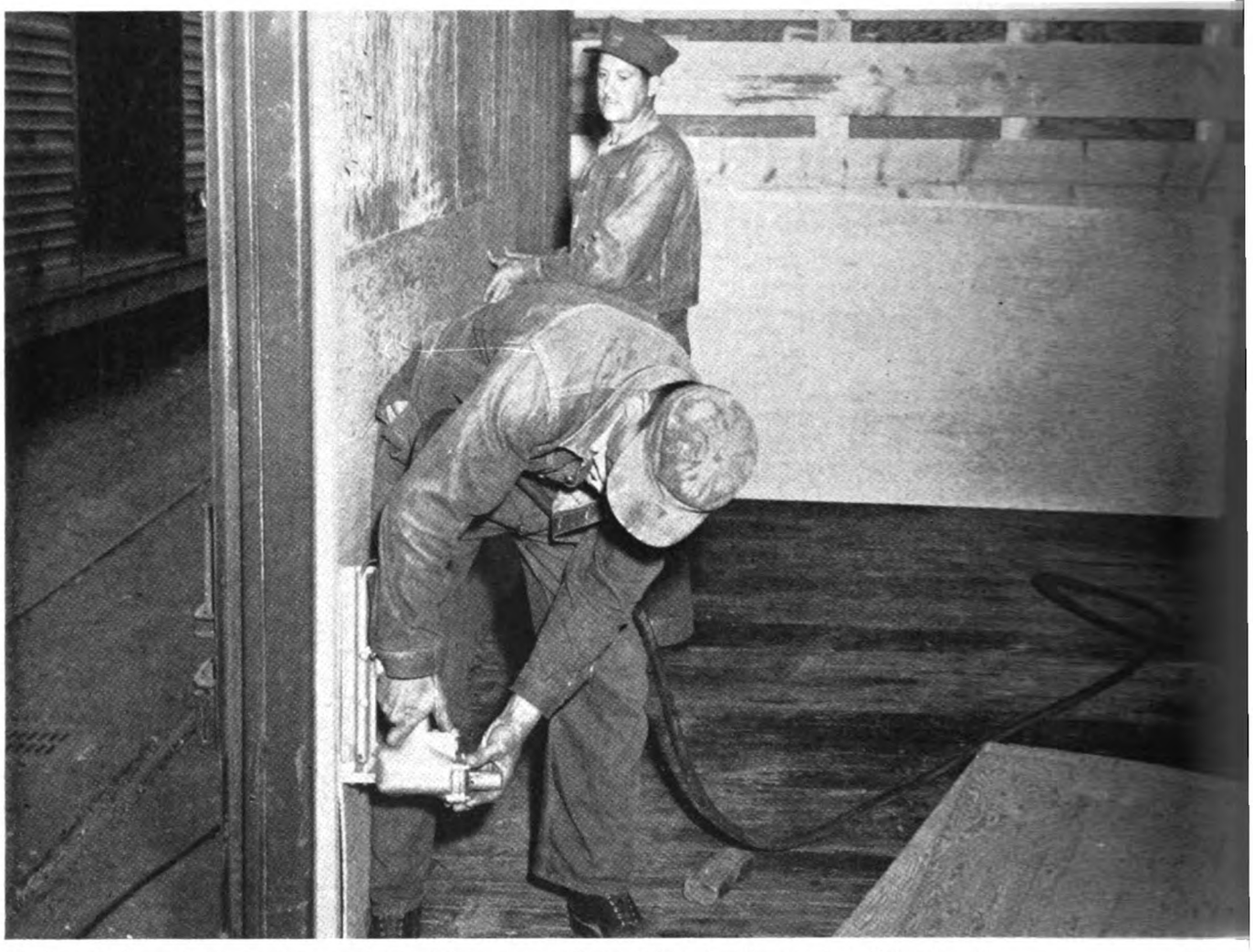


Stapling of plywood lining sheets is completed at door post on SP car. Rabbeted nailing strip is applied at doorway.

Southern Pacific Upgrades Box Cars W

SINCE THE FIRST of this year, over 1,500 Southern Pacific box cars have been converted from "rough loaders" to smooth, top quality Class A cars. While the end product is the same, the work varies slightly in different areas on the railroad. The Pacific Lines cars repaired on the west coast have 8-ft linings and floors upgraded with cement. Texas and Louisiana Lines cars have 6-ft linings and floors of plywood.

The key to the entire program is smooth, tough, water resistant, standard sized panels of ¼-in. fir plywood applied directly over floor, side walls and ends. Installation is based on an old principle, stapling, which was never tried before. Almost twice as fast as nailing, the sheets are rapidly applied over old surfaces and fastened in place with pneumatic staple guns driven by 90-psi air pressure.

The program was started on a test basis two years ago when a limited number of Class B and C cars were converted to A condition. Results were so satisfactory that additional programs were quickly scheduled. Re-lining with plywood was based on the SP's former practice of stapling Kraft-coated veneer over scuffed car walls as an emergency measure to provide more cars for handling such cargo as canned goods. The veneer lasted about one season while the plywood is expected to last four or five years.

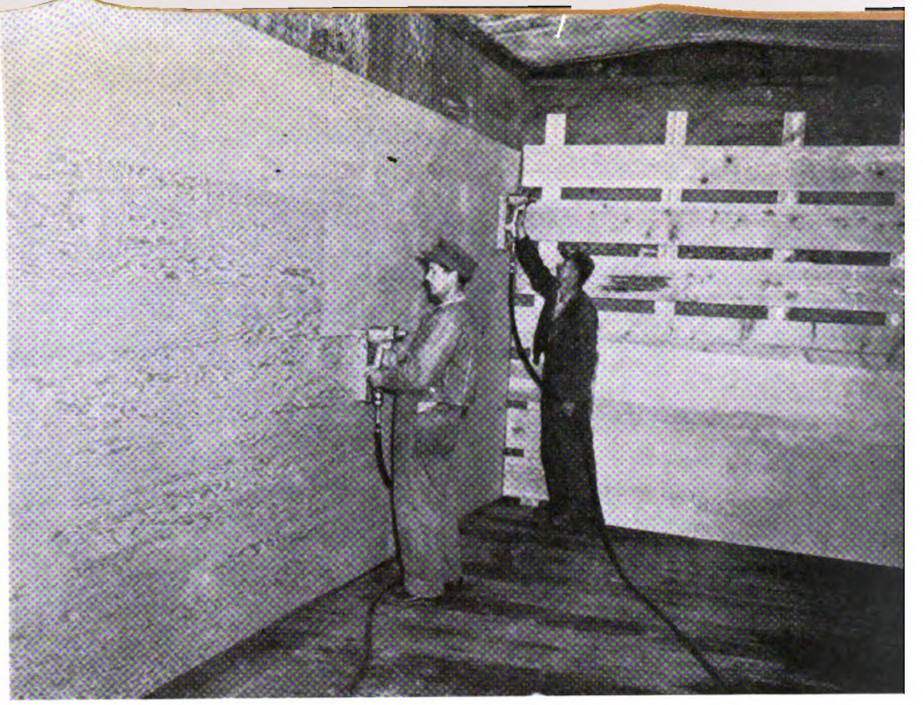
How Work Is Done

As cars come in for re-lining, they are painted outside when necessary, and the new SP lettering stencil is applied. If contaminated with oil, creosote or other foreign material, the interiors are cleaned with steam and disinfectants. Cement upgraded floors have 10 gal of floor cement applied, brus with a 12-in. push broom to non-skid surface.

Old veneer, where present, out and protruding nails and ta removed. Broken boards on th wood wall are repaired. Small boards are left unpatched. Fals heads are built to square bulg ends. They are covered with ¾ 12-in. lumber the width of th Nailing strips, rabbeted to take plywood, are fastened to the si the door posts. Another rabbet ½ in. deep in the nailing strips s fit tightly around the metal door

Exterior grade plywood pane then overlaid on both walls and e a height of either 6 ft or 8 ft. i a gap of about 2 in. next to the Regular car maintenance—washin removal of grain and debris, is

ver saw quickly cuts away damaged floor. T&L es shops are applying plywood over this decking.



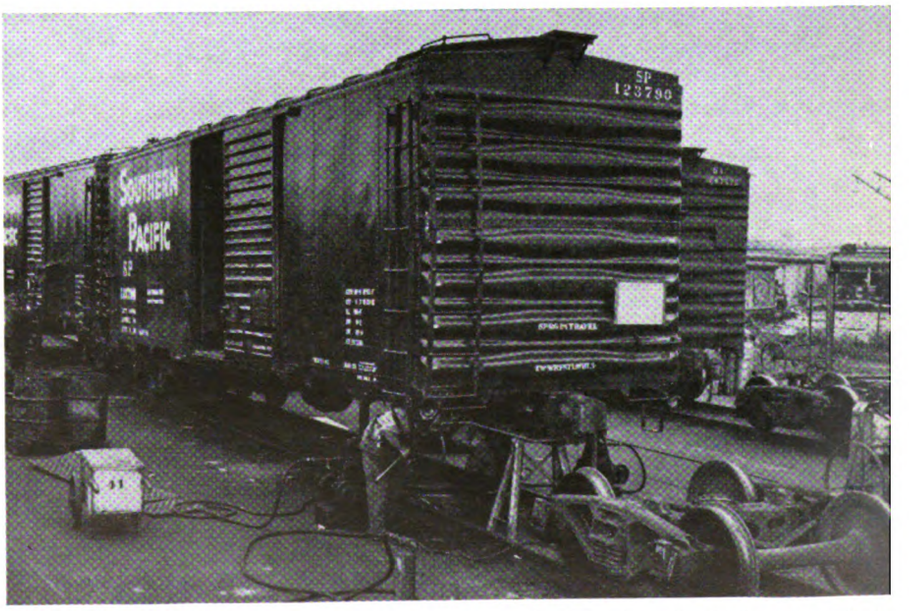
Lining 8 ft high is applied to cars reconditioned on Coast Lines. Staplers are claimed to be much faster than nailing.

Floors on Coast Lines cars are upgraded with application of cement. Plywood does not reach t the floor.

Plywood

asier. The panels are applied horizon-lly. Either two 4-ft sheets or one 4-ft nd one 2-ft sheet make up the re-uired height. The joints are staggered nd any trimming is done on the job ith a portable electric handsaw. In-allers shoot staples horizontally at -in. intervals around the perimeter of ach panel. SP officials say that if the anels are properly stapled, they won't arp even when wetted repeatedly.

One of the chief advantages of the lywood-stapling method is that the ars are out of service for only a very hort time. The cars come out clean nd costs are low. The program is being arried out by shop forces on the Pacific Lines at West Oakland, Cal. The Texas and Louisiana Lines work is lone at the Car Cleaning Track and t Englewood Car shop in Houston, nd at Avondale, Lafayette, Ennis and San Antonio.



Exteriors of cars are repainted and the trucks are overhauled and modernized as part of th extensive upgrading program.

1102
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ELIZA DOOLITTLE
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A Golden Milestone in American railroading . . .

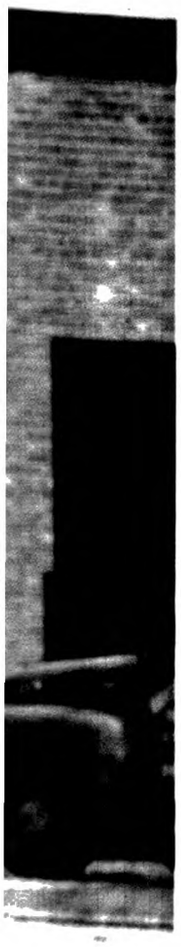
1,000 NEW LOCOMOTIVES FOR OLD

American railroads are reaping another round of Dieselization benefits by turning in old Diesel locomotives for new. The thousandth such locomotive has just come off the assembly line at La Grange—upgraded to today's standards and at substantially less cost than equivalent power in a completely new locomotive.

It's the pay-off on an engineering policy long in effect at Electro-Motive—making every improvement in components applicable to earlier models. The result: power that can be kept abreast of today's need for greater flexibility and capacity.

To accomplish this at costs below that of completely new units, regular factory production lines have been revised to accommodate remanufactured components along with new production. It's all part of a continuing plan to help our railroad customers keep power requirements fulfilled at the lowest possible cost.

For details on how locomotive modernization can benefit your railroad, call your Electro-Motive representative.

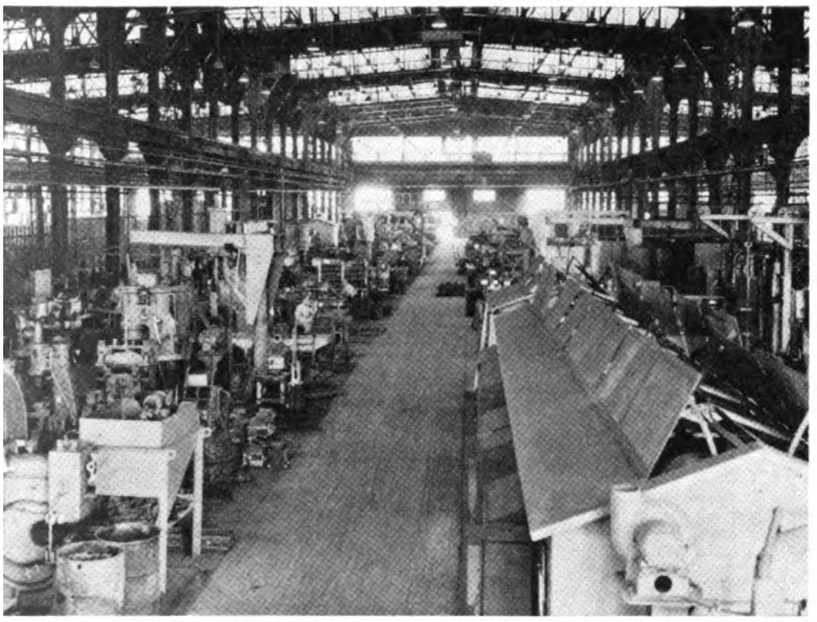


The thousandth new locomotive for old is this Chicago and Eastern Illinois Railroad passenger unit. "New" 2400 horsepower E9 locomotive contains certain remanufactured components from a twelve-year-old E7 locomotive (photo at right) turned into Electro-Motive after a 1,600,000-mile, high-speed career. "New" unit was christened Eliza Doolittle after the flower girl in the play Pygmalion on which the current play "My Fair Lady" is based.

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS

LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*

In Canada: General Motors Diesel Limited, London, Ontario



Main shop reclaims major car components such as couplers, side frames, and brake beams. Rearrangement of shop included installation of car-bottom furnace (center right), relocation of machines to streamline material flow, and elimination of overhead cranes. Machining of built-up parts is done tools in this machine shop which was recently equipped with new fluores fixtures producing a work-level lighting intensity of 30 footcandles.

'Centralized' Reclamation

New York Central has been changing its reclamation plant to do a bigger and more economical job

THE NEW YORK CENTRAL'S program of reducing operating expenses by every means has involved a consolidation of repair facilities by the mechanical department. In the course of this, the reclamation and repair of many car and locomotive components have been centralized at the Ashtabula (Ohio) Scrap and Reclamation Plant.

For years, this plant has dismantled retired cars and locomotives for the NYC, prepared and classified the resulting scrap, and reclaimed certain parts for re-use. Actually, changes have recently been made there with the aim of increasing the volume of reclamation, and making the processes more efficient and less costly.

Not long ago, for example, steam heat connectors for passenger cars were repaired in the shops at Mott Haven (New York City), West Albany, Englewood (Chicago) and Beech Grove (Indianapolis). Today all this connector work is being done at Ashtabula with an increase in man-hour productivity of 30 per cent. These connectors are completely overhauled and are thoroughly tested before being sent to all system passenger car repair points for reuse.

The entire Ashtabula operation involves over 400 men at present work levels. Recently, the plant has been scrapping 18 freight cars, one passenger car, and one locomotive daily. Typical output has been about 75,000 tons of ferrous scrap per year. This scrap is cut to foundry and open-hearth sizes and completely segregated.

Even this scrapping has been studied to make it more efficient. The Central has the Ashtabula plant completely piped with oxygen and acetylene. The oxygen comes from a large cascade serviced by Air Reduction, and the acetylene is produced by two Airco automatic generators. Studies of metal cutting procedures have been undertaken because a steady increase in labor costs can make it more economical to step up gas consumption, if it will increase cutting rates. Gas prices have been fairly stable. Currently, a series of tests are being concluded on determinations of the most efficient cutting tips, and the best oxygen pressures to get these maximum cutting rates. Already tests have been finished on the use of natural gas and liquefied petroleum gas as possible substitutes for the acetylene. At Ashtabula, acetylene has been found best for demolition work.

Classification and processing of nonferrous scrap have led to the production of pigs of fairly pure brass, copper, lead, and aluminum by methods new to the Central. Ashtabula was ge increasing quantities of electrical c switch gear, armatures, radiators, other components from diesel and el tric locomotives. At the same time, shop was receiving signal departm scrap of a similar type.

A second-hand 6,000-lb, oil-fire brass furnace was obtained. It w equipped with an air motor for pour At first it was thought that mixtures all the non-ferrous scrap coming the shop could be melted together this furnace and then be separated pouring at their successively hig melting points. For instance, tin w be poured at 450 to 500 deg F. a at between 600 and 700 deg F. zinc at 750 to 850 deg F.

This did not prove to be succes Actually, the NYC now hand s electrical scrap into copper, brass, minum and other classifications. attempt is made to remove bake rubber and other organic mater which form the insulation, guides housings for many of the parts. Inst these materials are either burned in the furnace or form a slag w can be poured separately. A two-a charge of any of the sorted metals melted in about three hours. The

(Continued on page 44)

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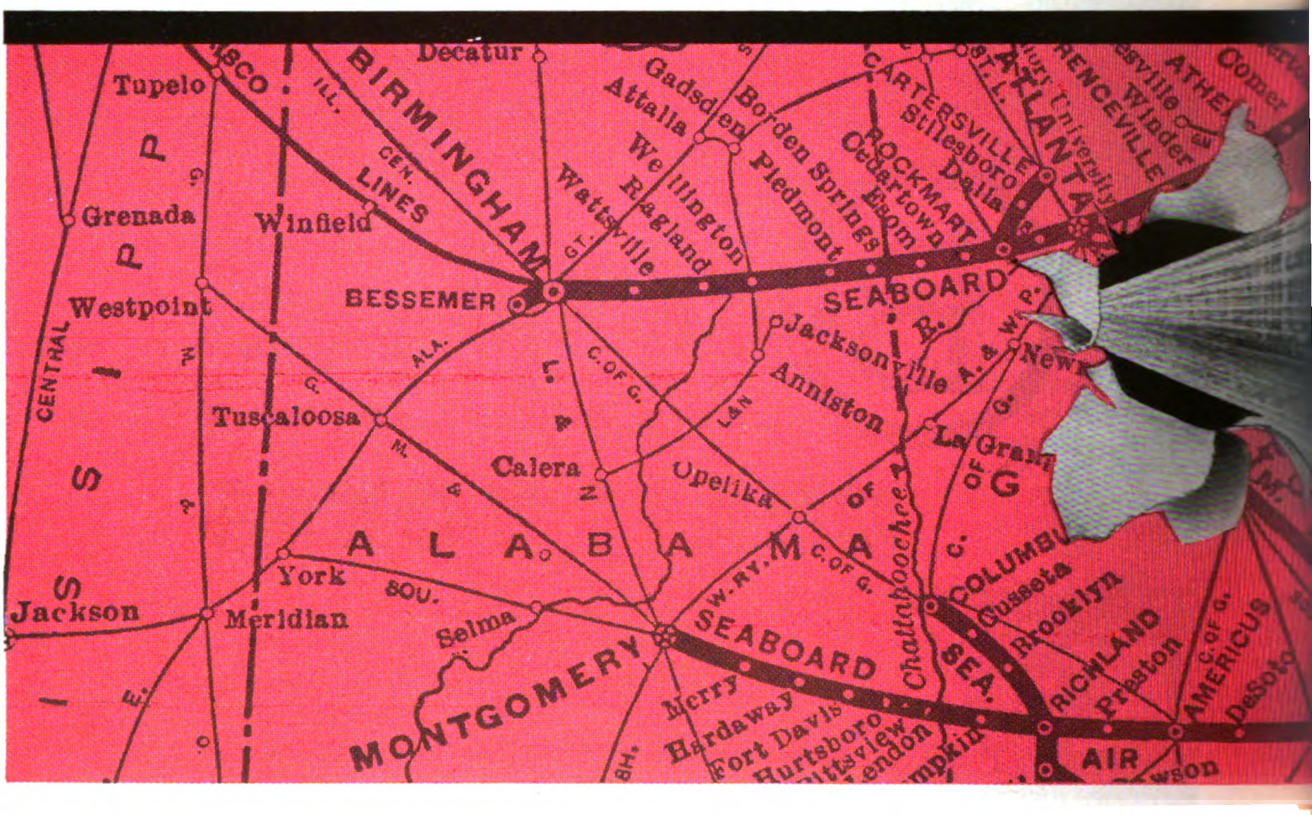
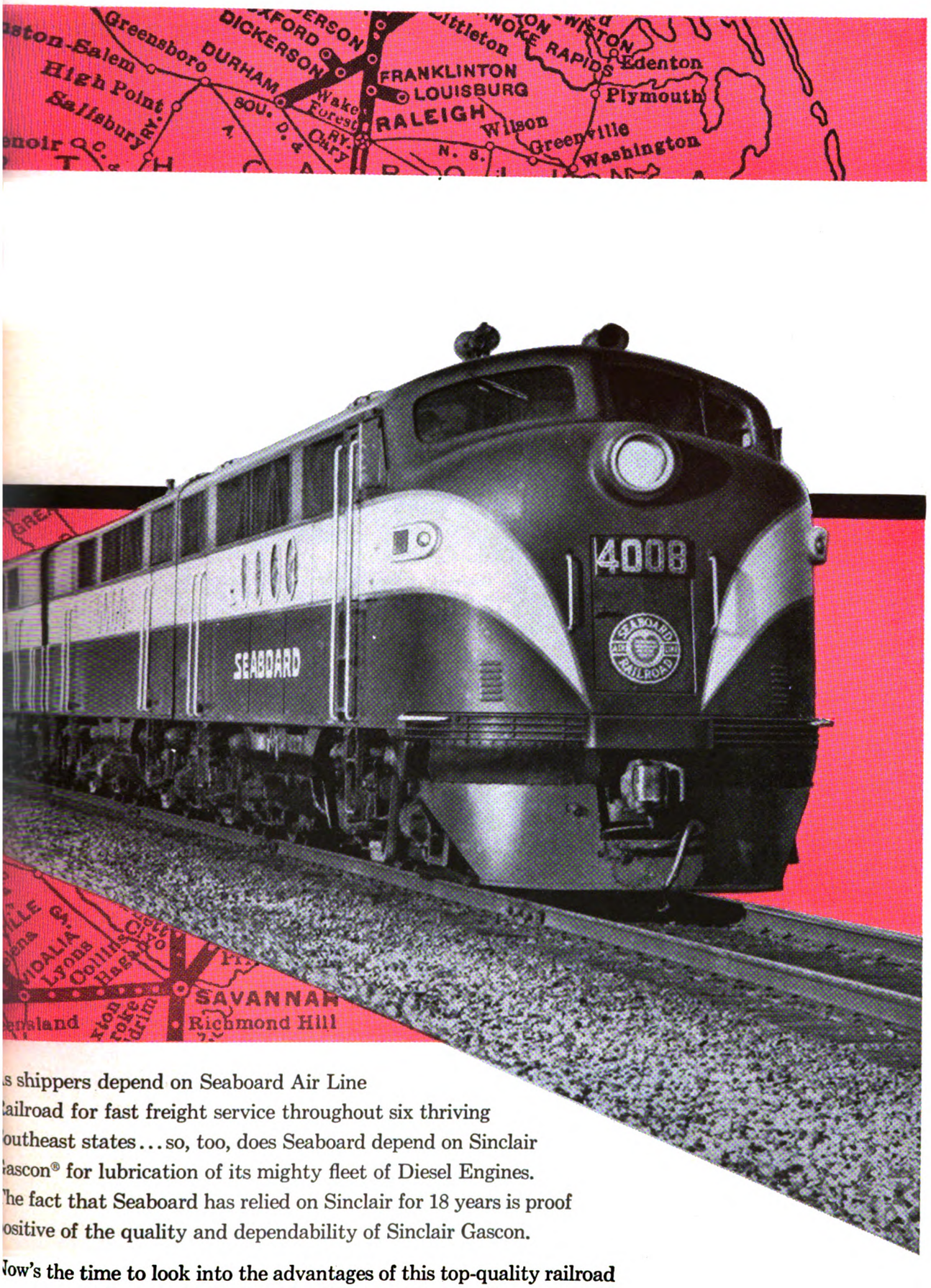


SINCLAIR RAILROAD LUBRICANTS



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are being sold at prices which make the process attractive.

The main shop building at Ashtabula contains the tools and equipment used in the reclamation of major car components. These are such parts as couplers, yokes, holsters, side frames and brake beams. Many of the tools have been rearranged in this shop to streamline and straighten parts flow. Materials handling methods have been completely changed.

To give an idea of the results produced by NYC's industrial engineers at Ashtabula, the distance traversed by a coupler during reclamation has been decreased by ¾ mile in a building only 500 ft long. Straight paved aisles, the relocation of machine tools so they can be reached by fork trucks have almost eliminated the use of overhead cranes. This has helped production because formerly work stopped each time an overhead crane carried something down through the shop. The foreman's office was installed on a balcony which has been an aid in controlling every phase of the operation.

Air Brake Shop

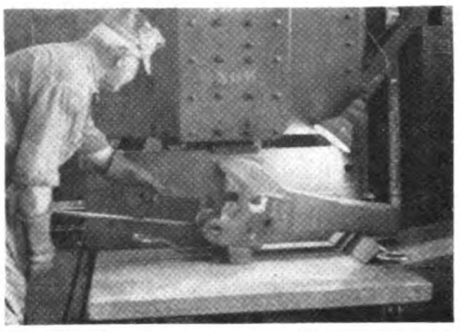
The air brake shop handles a number of items which come through in large numbers. Among these are the steam connectors—already mentioned—air hoses, brake cylinders and other brake components. The recently installed air hose line consolidates this type of work at Ashtabula. Some clamping machines were brought in from another shop. At that shop, the work flow was not progressive and the operation occupied a space four times larger than is now used. The new production line can turn out 400 hoses per day.

At full hose production, four men are required. The first man strips the old hose and puts the couplings and nipples in separate containers. A second man gages, inspects and buffs the couplings, and installs new gaskets. These couplings then travel on a belt to the assembly station where a third man installs them on new hose and passes the hose to a fourth man who operates a Punch Lok clamping machine to secure the coupling and nipple. He also tests the hose. No man need move from his work station. A less elaborate set-up is just now being developed for armored hoses.

The line for reclamation of steam connectors has turned out as many as 1,500 units a month. The reclamation includes building up the clamps and the gasket seats on the heads.

This set-up must be arranged so that

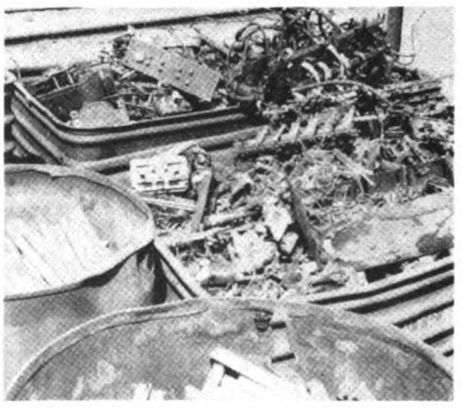
(Continued on Page 46)



Initial heating of couplers for 20 min at 1,700 deg F opens up any cracks and prepares them for gaging. Under air press, opening is first closed and shank is then straightened.

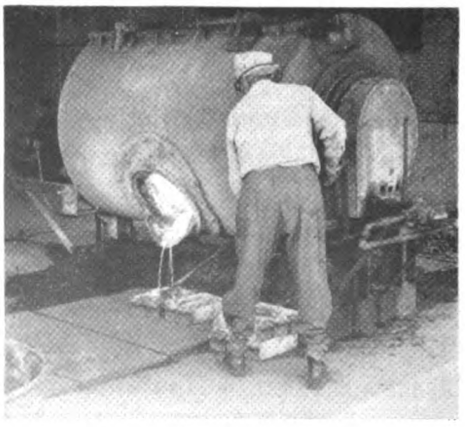
Experimental cutting with flowrators shown mounted on gas manifold in scrap yard has yielded data on most efficient tip and best oxygen pressure. Central uses acetylene, but has tested propane and natural gas.

Brake cylinder reclamation line recently set up includes this bench for working pistons. Bins for individual parts are at rear. Lathe has been installed on this line to do cylinder work exclusively.



Classified scrap in tote boxes consists of brass charge in the form of valves, contactors and similar parts. Barrels contain shielded cable.

Non-ferrous metals cannot be mixed indiscriminately and then separated only on the basis of their melting points shown on table near furnace.



Molten brass is poured from oil-fired furnace. Some insulation is burned out of scrap charge but bakelite and similar materials form a slag.

Pigs of various metals can be sold at prices which make the sorting and melting of scrapped electrical parts worth-while for the NYC.

Yellow Strand Braided Safety Slings

You're sure with Yellow Strand Braided Safety Slings on your equipment. These slings combine strength and flexibility to provide safety and ease of handling.

There's a Yellow Strand Sling designed to handle any load on your railroad from a highly polished crankshaft to a Diesel locomotive. Write us today and tell us the size, weight and nature of your problem lift. Our engineers will design a sling to exactly meet your needs! Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.

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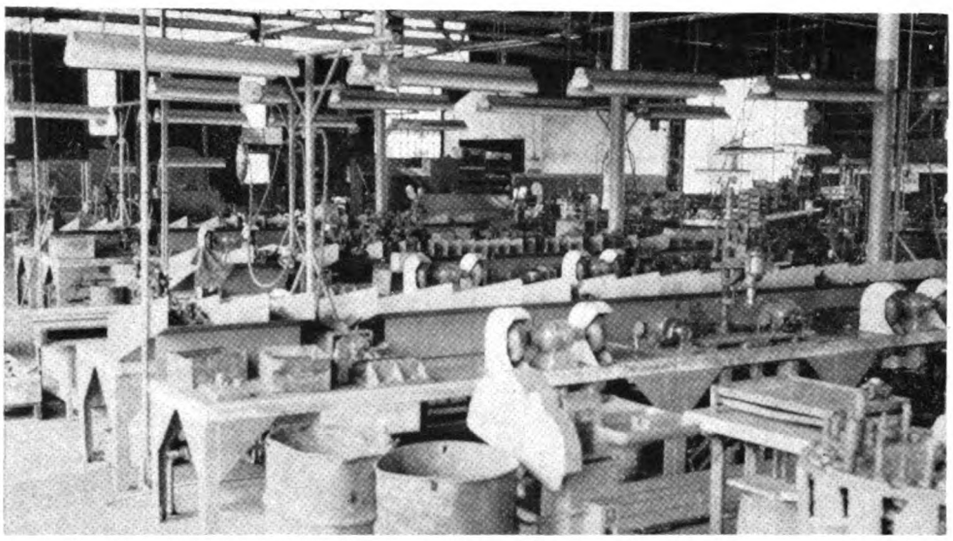
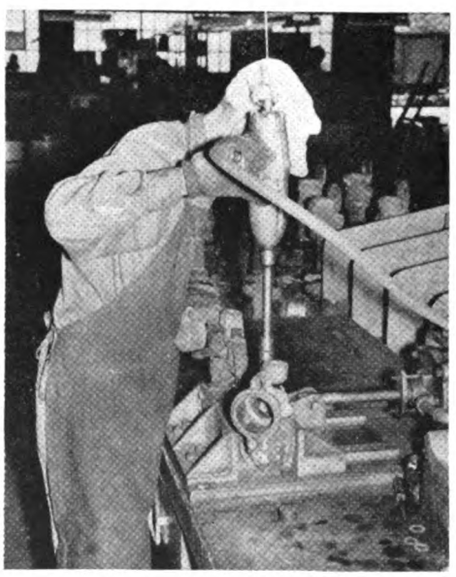
NYC Reclaims Its Steam Connectors



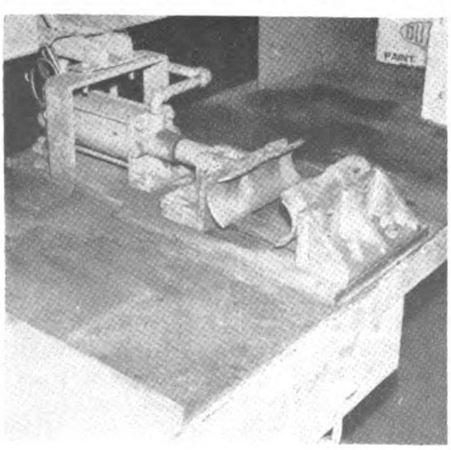
Steam heat connectors, handled in brake shop, are torn down and assembled on any one of three benches. On near sides of these benches, connectors are disassembled. Parts are classified in sloping bins feeding to assembly position on the opposite sides.

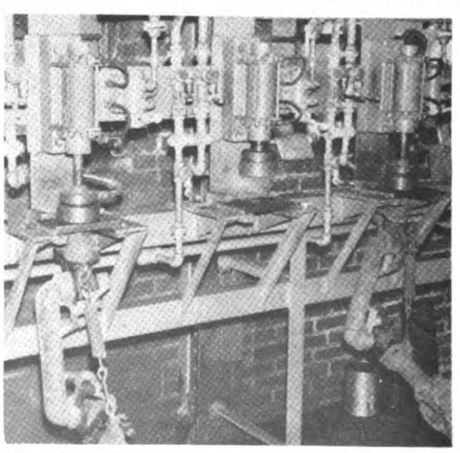
Brazing is used for build-up of some worn surfaces. This positioner is treadle-operated.



Air-operated wrench is suspended over assembly position.

Below: Bench clamp holds connector while it is being assembled.
Center: Test rack for steam heat connectors has four positions. Adapter plates make it possible to test different sizes. Air cylinder clamps gasket-equipped cap on top of connector and steam is then fed through it.
Lower right: Test consists of closing end of connector and filling it with steam at train-line pressure. It is then moved at all flexible joints to test for leaks. Finally, it is coated with water to make removal easy.





production can be varied greatly because the demand for these connectors changes through the year, with the peak during winter months.

Three double benches are used. The center of each bench has a series of sloping bins from which parts feed to the assembly stations. Connectors are torn down on one side. Parts which do not require re-working are buffed, inspected and placed in the bins. Others which require building up, go to welding or brazing booths and to the machine shop before coming back to the assembly benches. Depending on the work loads, connectors of 2 and 2½ in. sizes may be handled on separate benches. The same thing may be done with those made by Barco and Vapor Heating Corp.

A most interesting feature about the connector reclamation is the test rack for checking connectors after rebuilding. Its features include air cylinders which clamp the steam connectors to the test outlets and quick-operating valves on air, steam and water line to these test outlets. These features are responsible for the greatly reduced labor costs and increased production in this phase of the operation.

The test rack has four test outlets and can be worked with one or two operators as production requirements dictate. After being placed in the rack, steam is passed through the connector after a dummy coupling has been applied to close the end. After the steam tightness is assured, water is passed through the connector to cool it for handling. Water and condensate go into a pit under grating floor at test rack.

Equipment of the type described has been a big factor in controlling maintenance of equipment costs on the New York Central. Not only in this shop, but in all its installations, procedures are always being refined with the aim of reducing costs still further.

Research Finds Extra Dollars of Income Through Savings in Maintenance!

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ANALYSIS OF TYPICAL SLUDGE IN DIESEL LUBRICATING OIL

Oxidized Oil (Resins)	19.0%
Amorphous Carbon (Soot)	34.0
Miscellaneous Metals	0.8
Silica	0.2
Water	3.0
Lubricating Oil	43.0

Shown at the left—the famous WIXITE Primary Fuel Filter Cartridge, long recognized for extra protection and extra mileage. At the right—the New WIX POROSITE Second Stage Fuel Filter which completely changes standards of performance in the filtration of Railroad Diesel Fuel Oil.

The analysis shown is that made of sludge deposits taken from a Diesel engine crankcase and it should be borne in mind that the percentages shown will vary substantially with: A) Different engines, B) Various types of service, C) Differing geographic areas and D) Efficiency of filters.

WIX Filter Cartridges are available in a broad selection of filtrants to enable maintenance technicians to prescribe precisely the filtering formula suited to the individual engine, conditions of service, etc.

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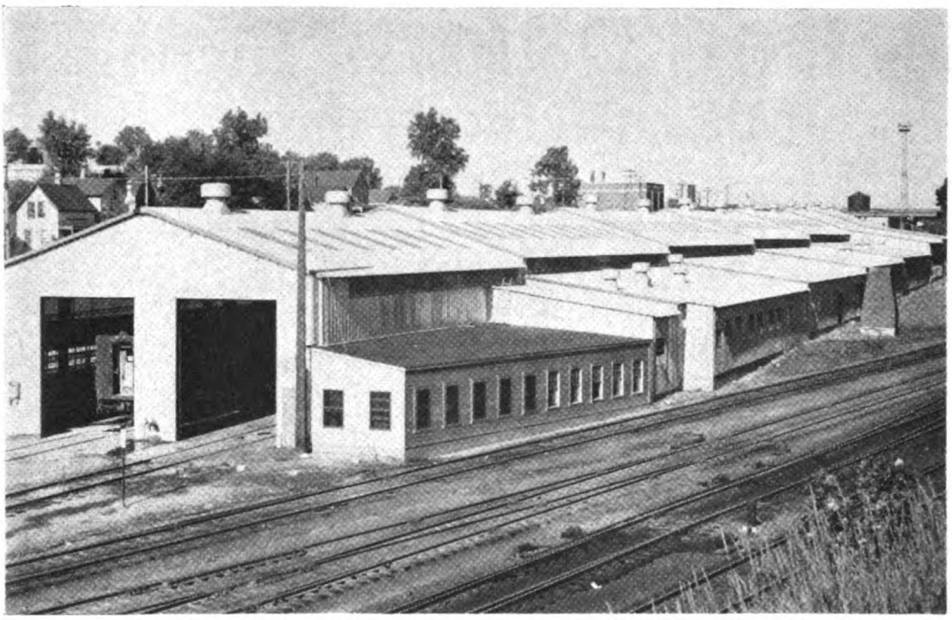
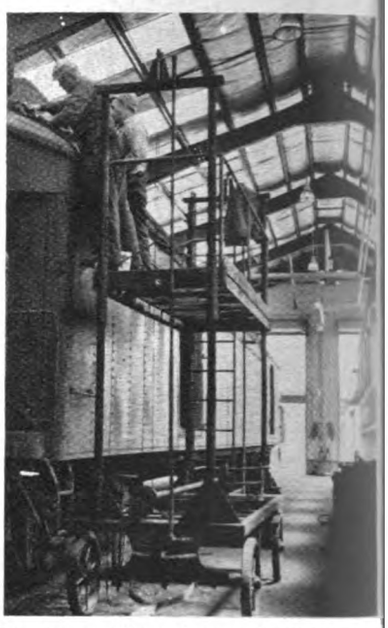


GN passenger trains terminating at St. Paul, Minn., are now serviced on one of the two tracks running through this 625-ft building.



Repairs on sides and tops of passenger cars are made easily with adjustable-height platforms.

How the Great Northern

Solves Its Winter Coach Repair Problems

New heated coach yard building consolidates all repair services to improve efficiency

NINE TRACKS, each over 1,000 ft long, in the Great Northern's Mississippi Street Coach Yard, St. Paul, Minn., have been used for servicing passenger trains. They operated efficiently when compared to many such installations. However, six months of winter hampered operations. Servicing schedules for equipment of the Winnipeg, Red River and Twin Port runs must be maintained. Materials handling and necessary repairs were slowed down by snow, ice and extremely cold weather. As much as three tons of ice had to be removed from a single car for inspection and repairs. Workmen wore heavy bulky clothing and mittens, and even

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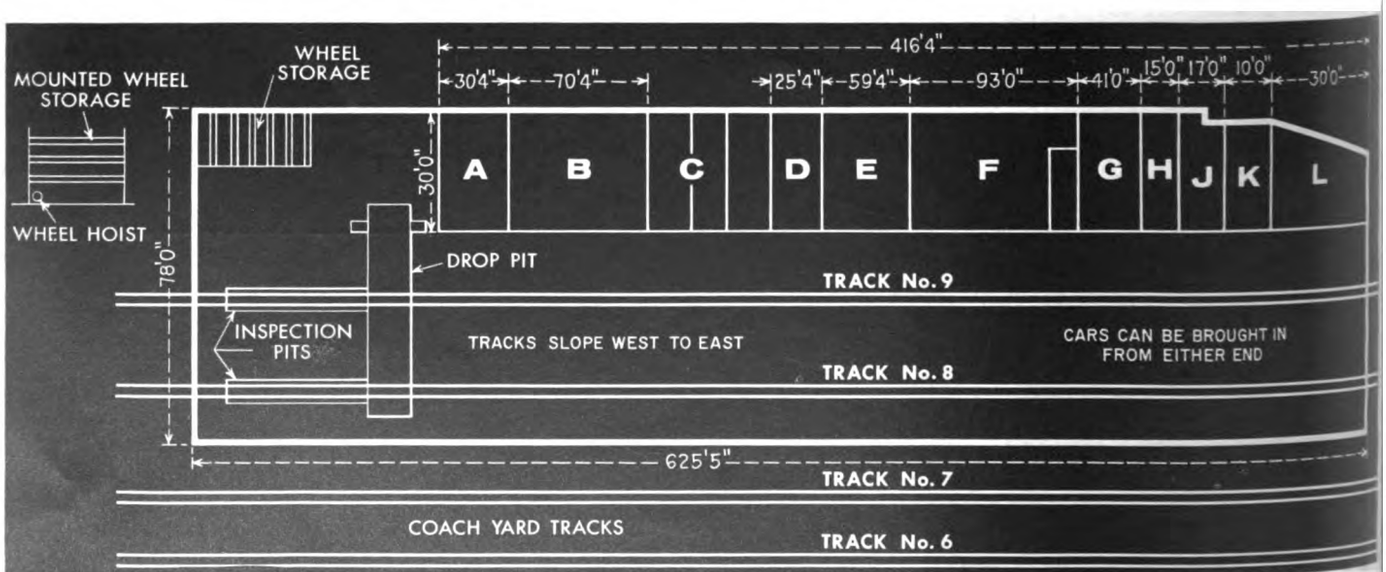
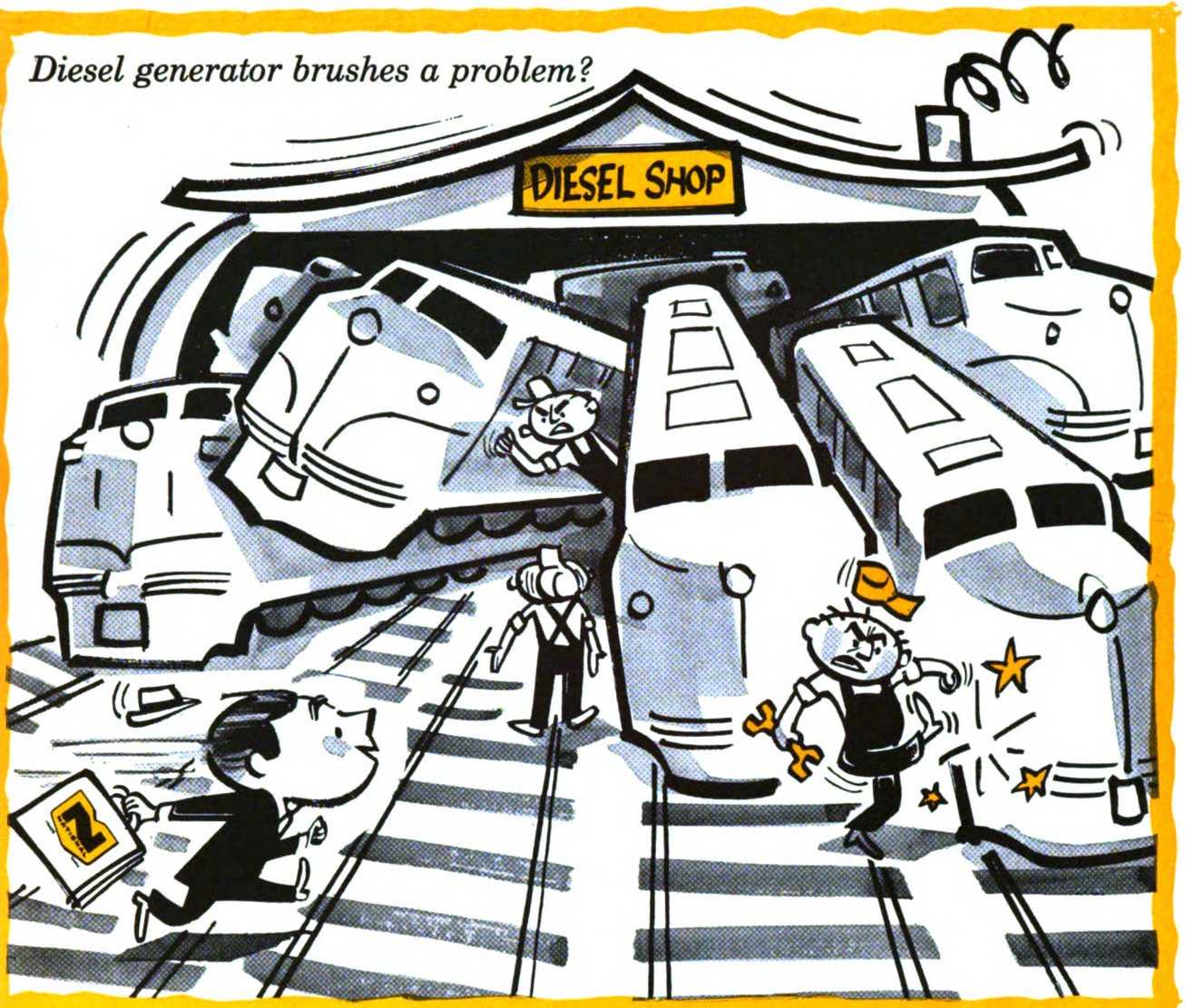


Work area of approximately 50,000 sq ft has been provided in new repair building. Series of small rooms on the north side of the building include (A) office, (B) locker room, (C) toilets, (D) tool and brake room, (E) electric shop, (F) storeroom, (G) smith shop, (H) oil room, (J) upholstery shop, (K) filter room and (L) locker room.

Diesel generator brushes a problem?



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JOHN PEDLAR

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John Pedlar and his fellow "National" Carbon Brush Men have been solving railroad brush problems for years. Their experience and training – backed by "National" *long term brush development* – make them the logical consultants on any railroad brush problem.

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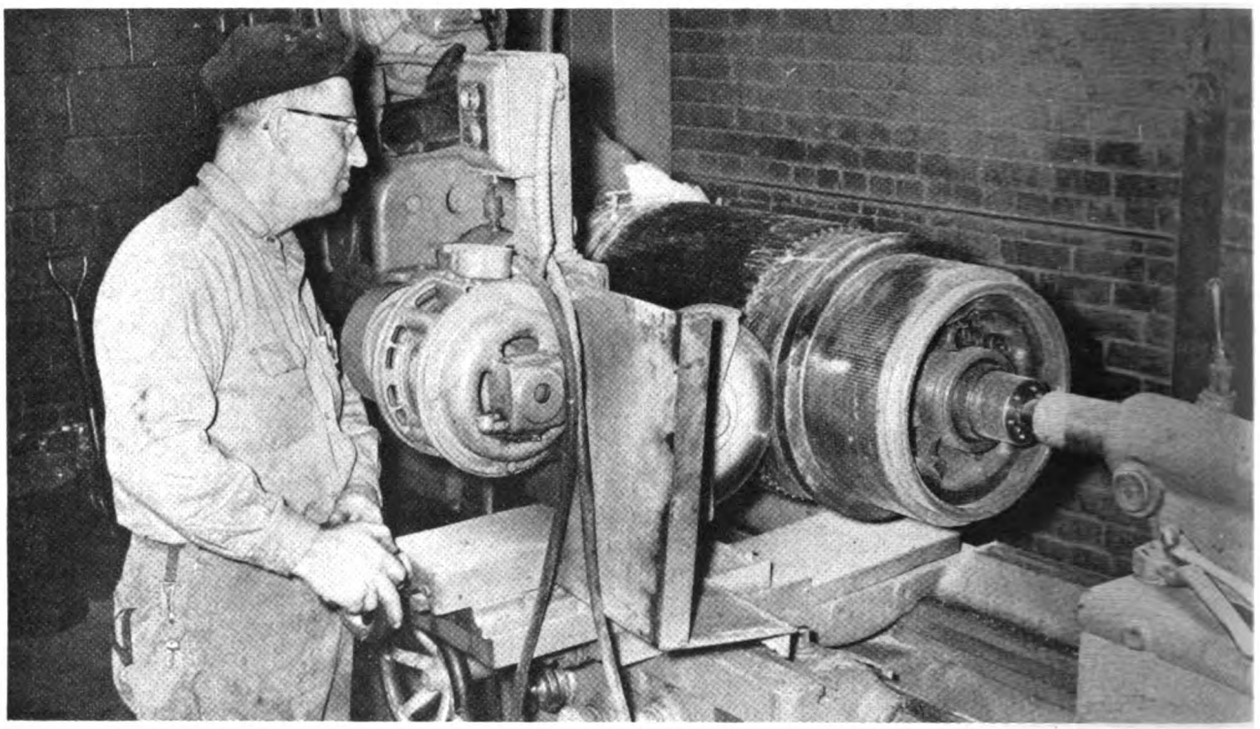

Armature conductors can be sawed through before stripping the winding.

10

Roll Them Out Like New

Armature Stripping

ARMATURE REBUILDING is a major operation requiring skill and involving the use of special tools not usually found in a railroad backshop. As with surgery, proper preparation is of prime importance. Carelessness can cause needless trouble and expense. It's as necessary to know the internal construction of the armature as it is for a surgeon to know human anatomy.

Certain special tools, including a shimming knife, a lead-lifting tool, a lead-drifting tool and an equalizer slot cleaning tool, will be required. They are necessary to open the soldered joints and to remove the main and equalizer coil leads without damaging the commutator risers. A small rotary sander is useful for cleaning the riser slots and saves a lot of time over hand filing. Approximately twenty commutator riser slot gages are needed to help straighten the risers after stripping. These can be made from ordinary cold-rolled sheet steel slightly thinner than the slot width.

You will also require long coil-lifting bars suitable for use in core slots, bolt cutters for cutting through heavy coil sections, wedge driving tools, and an air hammer. Hardened core slot gages, ground to have just enough looseness for an easy "feel" in a correct slot are handy for checking the straightness of the core teeth after stripping and the accuracy of slot size after straightening and cleaning. A gas torch is needed for heating the commutator risers to soften the solder. Natural gas is better than acetylene because it covers a wider area and is less liable to overheat and anneal the bars.

Different Methods

Armature stripping procedures vary from shop to shop. The method used is determined largely by the equipment available and the volume of work handled. Bands and wedges are generally removed first. The wire bands are usually cut through with a chisel, but some shops grind through them with an abrasive wheel. Usually the winding is not protected because it is to be scrapped. If it is to be saved, a blade tool about one inch wide and $\frac{3}{32}$ in. thick may be driven under the band. Then it's easy to chisel through at the edge of the blade without harming the winding. If you use an abrasive wheel, be careful not to cut into the winding. These precautions pay off when rebanding a good winding.

Most shops remove the wedges cold. This works well on old armatures with loose windings. On an occasional stubborn

(Continued on Page 54)

This is the tenth article in the series covering heavy maintenance of locomotive electrical equipment.

Part 10 is written by W. F. Davis, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

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Esso Diol RD crankcase oils meet the need of modern diesels for very effective and economical detergent lubricants that will provide maximum protection for sensitive engine parts.

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QUESTIONS AND ANSWERS

6-SL Brake Equipment*

What air connections are made? (W288)
The equalizing pipe is connected with passage *13*, and through *31* with the brake cylinder pipe.

How does this position of the H-6-B Relayair valve unit affect the brakes on the first locomotive. (W289)
They operate in the same fashion as those on basic equipment.

Where else is brake cylinder air maintained? (W290)
In the equalizing pipe.

What should be the position of the brake valve handle of the KH-6-P type on the trailing unit? (W291)
In *Lap* position.

Why is it necessary to have this brake valve handle in Lap position? (W292)
In order to close exhaust passage of distributing valve release pipe through independent brake valve portion and rotary valve.

What should be the position of the independent brake valve handle? (W293)
In *Running* position.

In multiple unit operation, what should be the position of the brake pipe cut-out cock on the trailing unit? (W294)
In the *Trailing* position.

What connection is made in this position? (W295)
Main reservoir pipe is connected to the transfer valve pipe.

What flow of air results from above connection? (W296)
Main reservoir pressure flows to diaphragm *10* of the transfer valve portion of the H-6-B Relayair valve unit.

What action now takes place in the transfer valve portion? (W297)
The diaphragm is forced downward by the air pressure, seating valve *17* and unseating valve *15*.

What air flow results from this movement? (W298)
The application cylinder pipe is now connected to passage *13*.

Explain the flow of air further. (W299)
Since main reservoir pressure is on the diaphragm of the cut-off valve portion of the relayair valve unit, passage *13* is connected to the equalizing pipe. Therefore, the application cylinder pipe and equalizing pipe are connected.

What insurance does this connection provide? (W300)
This insures that the brake cylinder pressure in the trailing unit will be identical to that in the first locomotive, since it places equalizing pipe air pressure in chamber *g* of the application cylinder regardless of the position of slide valve and piston.

*(*This is continued from page 60 of the Jan. 1958 issue.)*

NAILABLE STEEL FLOORING *being installed in one of 200 new gondolas for Canadian National Railways in the Canadian Car Company shops, Montreal, Quebec.*

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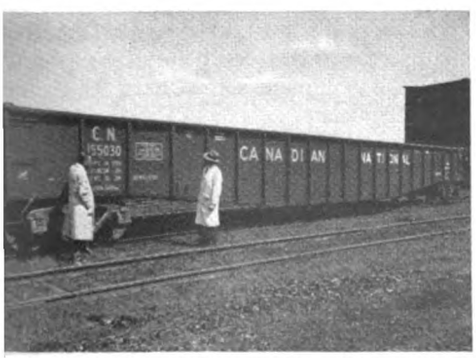

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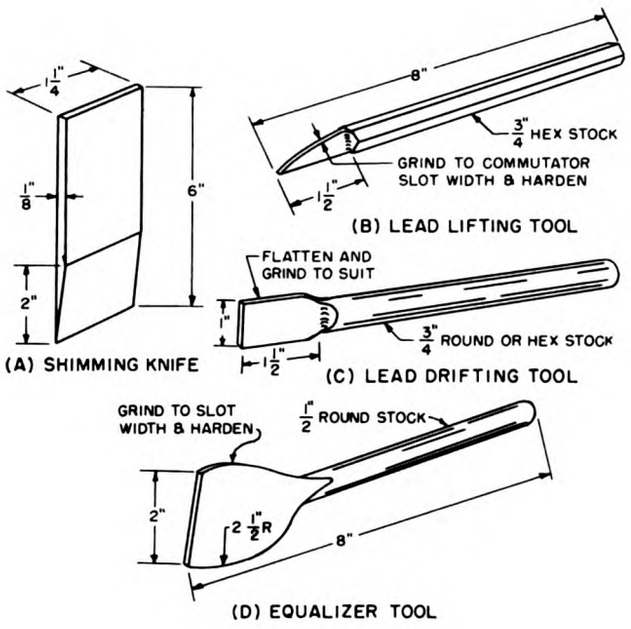
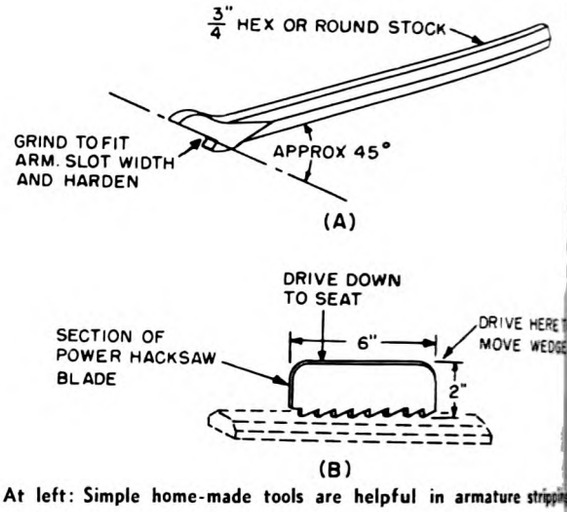




At left: Simple home-made tools are helpful in armature stripping.

Above: Tools for driving armature wedges. Stubborn wedges may be moved with lower tool.

(Continued from page 50)

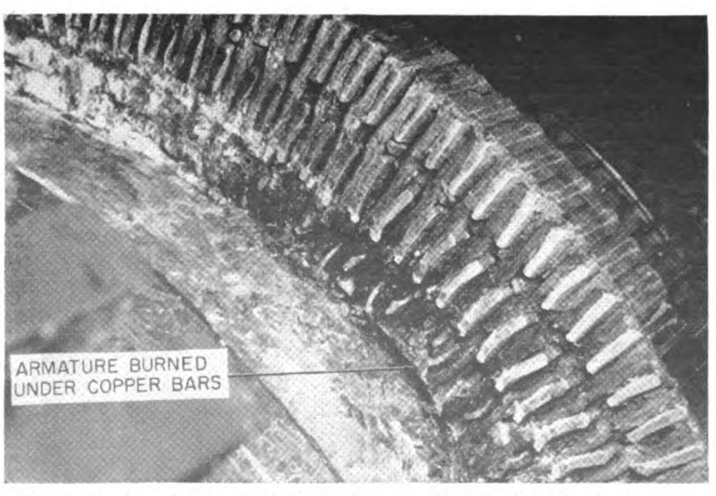
job it is helpful to soften the varnish by heating the armature in an oven, or with a gas torch as you work. Tools for driving wedges out are of various shapes. They should fit the slot with clearance, and present a maximum face area against the end of the wedge. Also, they should be easy to insert at the center of the core slot and have a biting edge to cut into the wedge to start it.

Wedges are usually driven out of half the slot length at a time, using either a hand or power hammer. If a wedge is stubborn, try starting a shorter length. Another form of "persuader" can be made from a power hacksaw blade. It is hammered down until all teeth are biting into the wedge. Diagonal blows will then move the wedge.

Circumstantial Evidence

By noting whether bands and wedges are tight or loose, and looking up the mileage on the machine, you will pick up valuable clues regarding the kind of service the armature has seen. An armature with upwards of a million miles of normal service will show some loosening of the bands and slight "powdering" of the insulation under the bands and wedges and into the lower layers of the winding. This is caused by movements and vibrations resulting from service conditions. In the case of traction motors, the principal factor is vibration from the gearing. Well maintained gears with co tooth profile run smoothly and are easy on the windings.

Worn gears with poor tooth profile cause destructive v tions which "shake down" the windings to failure in sh mileage. Here you see how good gear maintenance with co rect and adequate lubrication will pay off in long armat winding life. Report the conditions you find, particularly the case of low-mileage rewinds. When things are bad will want to inspect the pinion from the armature and necessary, check it with a profile gage. If the pinion is O the fault may be in the mating gear. Relaying this inform tion to the mechanical people will alert them to this possi cause of trouble and they can pull the bad gear out of serv before it does more damage.



After coils have been sawed off and removed, cut-off leads in risers are exposed at back of commutator. This armature has been burned.

Armature Stripping

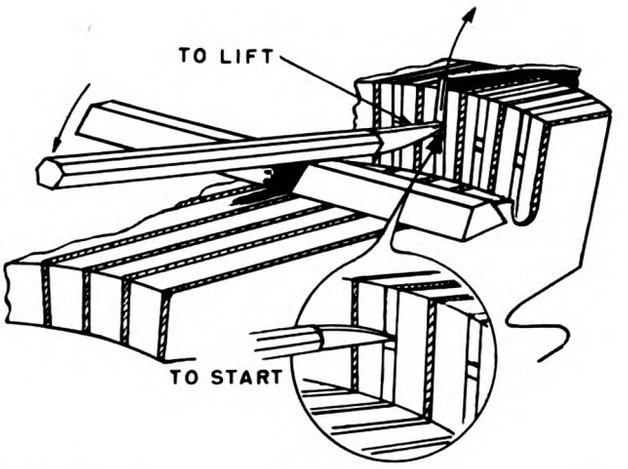
Many shops cut off the winding at both ends of the c This can be done with a chisel; by turning off using a co tool in a lathe; or by sawing. If the commutator is t reused, the lead ends must be removed as described l In sawing the coils, take care not to cut too deep or the in cone insulation will be damaged and you will then have commutator repair job.

Some shops pull the coils out with a power hoist. The legs of the coils are lifted so they can be gripped by a like a lineman's "come-along." Sometimes the wedges are removed first. The top coils are lifted from the slots, tea through the wedges. Considerable core slot straightening required when this method is used because the punching te move sideways when the wedges are sheared.

If the windings are not cut off behind the commutator leads will have to be lifted from the risers by hand bef the coils are pulled. The commutator will generally be sa Be as careful as possible with it—taking particular care to damage the thin risers. Do not bend the risers under upset the stability of the complete set of bars while dis necting the main winding leads.

When the coils are pulled by hand the work is some easier if the armature is hot. On jobs with the usual pa of high mileage wear, heating the entire armature is unne sary. The aged coils can easily be lifted cold. On most however, it is necessary to use a torch to soften the s in the commutator risers before lifting the leads. Whe armature has thrown solder and the leads have lifted. T can usually be removed without heating. If the soldered j are opened with a shimming knife, heat will not be nece

A simple set-up makes the job of lead lifting eas



At left: Power stripping an armature, without first removing wedges, can damage slots.
Above: Coil lead can be lifted out of commutator riser slot if soldered joints are first opened.

ient. So it can be rotated, the armature is placed in stals. A gas torch is clamped in a position to play flame he face of the commutator risers. The armature is rotated y few minutes just enough to move the hot area out of flame. The hot leads may then be lifted. Your gloves will get pretty hot working near the open flame, so have an pair handy. The first time around, only the top leads lifted. When all the leads of a coil are free, bend it back of the way. Then it is easier to get under the next coil of the risers to pry it up. Use only enough heat to soften solder. Overheating will damage the binder in the mica anneal the copper.

heavy screwdriver or small bar can be used to lift the enough to get a long pry bar into the slot under it. By ing and prying, the coil is lifted from the slot. After all top coils have been lifted, it's a good idea to get them of the way by snipping them off at the back with bolt ers. Then, working from the back end, lift the bottom coil ons from the slots. Since the bottom leads are still sold in the commutator risers, you will have to again use torch to soften the solder. Pry under the coil leads at back of the commutator with a small bar, working the out with the other hand.

sing a chisel, cut off the equalizers behind the commu-. Then you can remove this winding complete, leaving the leads in the commutator risers. These should be oved at once while the commutator is still hot. When g the torch this time, aim it to strike more on the brush ace than on the risers. Using the equalizer tool, work the front of the commutator, driving the loose ends to back with a "down and out" motion. This will push the and filler out and back, and clean the curved bottom of slot. You can usually tell if all the leads are out by check-whether any are still protruding at the back of the risers. e may break off in the riser slots, so check carefully.

e Cleaning

uch torn insulation will stick to the sides and bottoms he slots. Also, there will be varnish on the tops and ends he teeth, and in the wedge grooves. A lot of scraping, g and brushing is required to completely clean the core and. It is quicker to do a rough cleaning job with a knife scraper, heating stubborn patches with a torch to loosen n. A sand blast following this rough cleaning will remove the varnish and small bits of insulation. If this is not available, hand filing and wire brushing after scraping will produce a clean core. The cylindrical heads, as well as the core laminations should be cleaned. Small burned spots in the slots should be filed smooth or they will damage the insulation of the new winding. Repair of more extensive damage will be discussed later.

After the core has been cleaned the slots should be gaged to see if they need straightening. Bent teeth should be straightened carefully until the slot gage fits.

Commutator Checkup

Now that the leads are disconnected and the core cleaned, you are ready for further commutator inspection and test. Remove the outer string band and examine the mica cones for visible damage or burned spots. There can be bad burning under a group of bars which have shorted and lifted. You would decide to replace such a commutator rather than do further work on it. If everything looks O.K., make a hipot test at the recommended voltage to detect hidden faults.

If the commutator passes this test, you can go ahead with the cleanup job. Use a steel chisel with a long, gradual taper to open up the riser slots so you can sand the inner faces. Open one slot at a time, allowing the adjacent risers to bend until there is room enough for the file or sander disk. Work carefully so as not to damage the mica between the risers. After cleaning all slots, the risers must be straightened. This is done by using thin riser gages as filler pieces. Insert one in a slot and straighten the risers. Then insert another in the next slot and straighten the risers. Continue until the set of fillers is used up. Then remove the filler farthest from where you are working and use it in the next slot. Repeat this until all the risers are straightened.

As a final check you will want to make a bar-to-bar test at the recommended voltage. First, the commutator surface should be cleaned by sanding or brushing and the remaining dirt in the slots between the bars removed. This test will show up any shorts between bars. Considerable digging and scraping may be necessary to clear these up. Dirt must be removed in a manner that will not tear the mica insulation or make it flake out in the riser section. Keep cleaning and retesting until all the bars are clear.

Stripping the armature is really the beginning of the repair job—the foundation on which the rewind is based. The best house may collapse in a short time if the foundation is poor. So, the most carefully rewound armature may quickly fail if the cleaning and preparation are slighted or done carelessly.

They Didn't Double Cross This Diesel

By Gordon Taylor

A B-UNIT, MODEL F7, had been in a wreck that damaged control wiring. When repairs were completed, the electrician was instructed to check it out for service. He had the unit assembled as the middle unit of a three-unit locomotive, with an A-unit at each end.

The B-unit was placed so its front end was coupled to the rear of the east end A unit. This meant that the rear end of the B-unit was then coupled to the rear end of the west end A-unit. When the jumper cables were put up, it was found that something was wrong.

The first test used the controls of the west end A-unit. When its reverser was put in forward position and the throttle opened, this A-unit did move forward and the B-unit moved in the same direction, (actually the B was operating in reverse, as it should when coupled this way). However, the east end A-unit began moving its own forward direction, pulling against the other two units. Closing the throttle, the electrician studied this turn of events.

Finally, he said, "Let's move the controls to the controls of the A-unit at the east end and see what happens." The east end A-unit was set up for its forward movement. When the throttle was opened, this A-unit responded properly to its reverser setting, but again the B- and the trailing A-unit began to move the opposite way. Things were getting worse instead of better.

One of the other electricians said, "In training class, we learned that the jumper control cables have wires *8* and *9* crossed or reversed from one plug end to the other." These are the wires that connect the Forward and Reverse (*FO and RE*) trunk wires in the control circuit.

"I'll go along with testing jumpers," Belter replied, "but I think they're okay because the two A-units worked perfectly together before the B-unit was cut in." Jumper cables were tested and did prove to be okay. Belter said, "I guess we'd better call Doc Watts. This seems to be a case for him." Doc Watts, the electrical foreman, was an ace trouble shooter.

A worried Belter made a rough sketch and took it to Doc Watts. Laying the sketch in front of his foreman, Belter said, "Tell me what you make of this. That B-unit is the double-crosser in this line-up, but I have no idea what is causing the trouble."

"You call the B-unit a double-crosser," Doc Watts answered after some thought, "but I believe that the trouble can be corrected by putting a double-cross in that B-unit's control wiring. Let's make another diagram with an outline of control wires *8* and *9* as they should be."

The *FO* and *RE* wires are interchanged in the jumper cable. The *FO* and *RE* wires are also interchanged at the front jumper cable socket or receptacle of each unit. It will be noted that these wires are interchanged or crossed at the front end of the B-unit in the sketch. Since most A-units have only one jumper cable socket, which is at the rear end of the unit, the *FO* and *RE* trunk wires are not interchanged in the cable socket of A-units. If an A-unit is wired with a jumper cable socket at the front end, then the *FO* and *RE* wires would have to be interchanged in that socket.

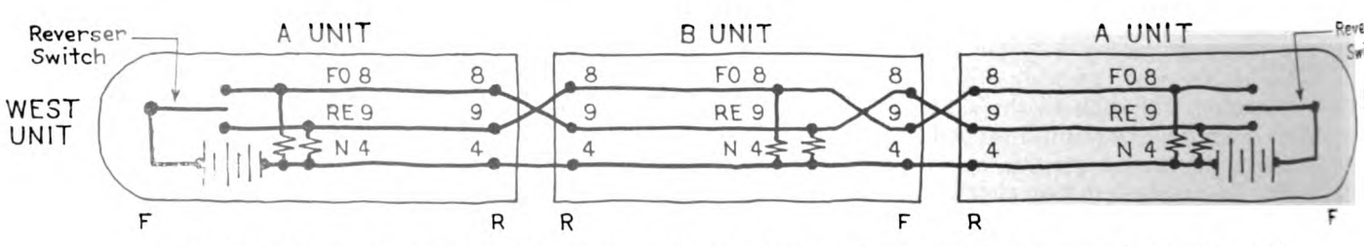
After checking his diagram, Doc Watts said to Belter, "I will bet that *FO* and *RE* wires were not interchanged on the terminal board located near the ceiling at the front end of that B-unit."

A quick inspection showed this to

be the trouble. With about two ... utes work, the connections ... changed and everything was okay. ... diesel units pulled together as ... members should.

When two A-units are connect... back to back, they need only the cr... ing of wires in the jumper cable ... make them work properly. In that ca... the *FO* (or *8* wire) is energized ... contact with the battery when the ... verser handle is moved to forw... position. The *8* wire then passes c... trol current through the jumper ca... to the *9* wire in the trailing A-u... The *9* wire passes control current to ... *RE* magnet valve. This establishes ... verse position on the trailing A-u... which now backs up to work with ... forward movement of the leading A-u...

If the control system is prope... wired and in good order, units can ... coupled together in any order. Th... will work together, for the *FO* and ... wire on the control will energize ... proper wire on the trailing unit's ... bring about proper direction of oper... tion. The diesel unit is pretty sma... It knows when it should back up ... order to move forward with the co... units.



Doc Watts came up with this simplified diagram showing the w iring through a B-unit and two A-units coupled together. With this he rapidly showed electrician Belter the solution to the problem of getting his balky B-unit back into service.

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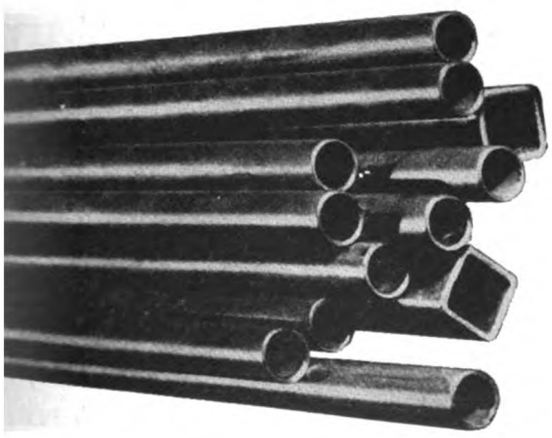
"Why, your USS Shelby Distributor, of course!"



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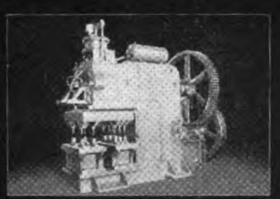

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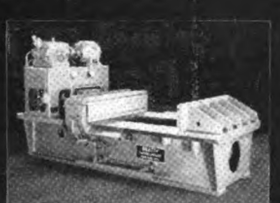

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GN Coach Repairs . . .

(Continued from page 48)

Materials handling equipment.

the simplest jobs could become difficult.

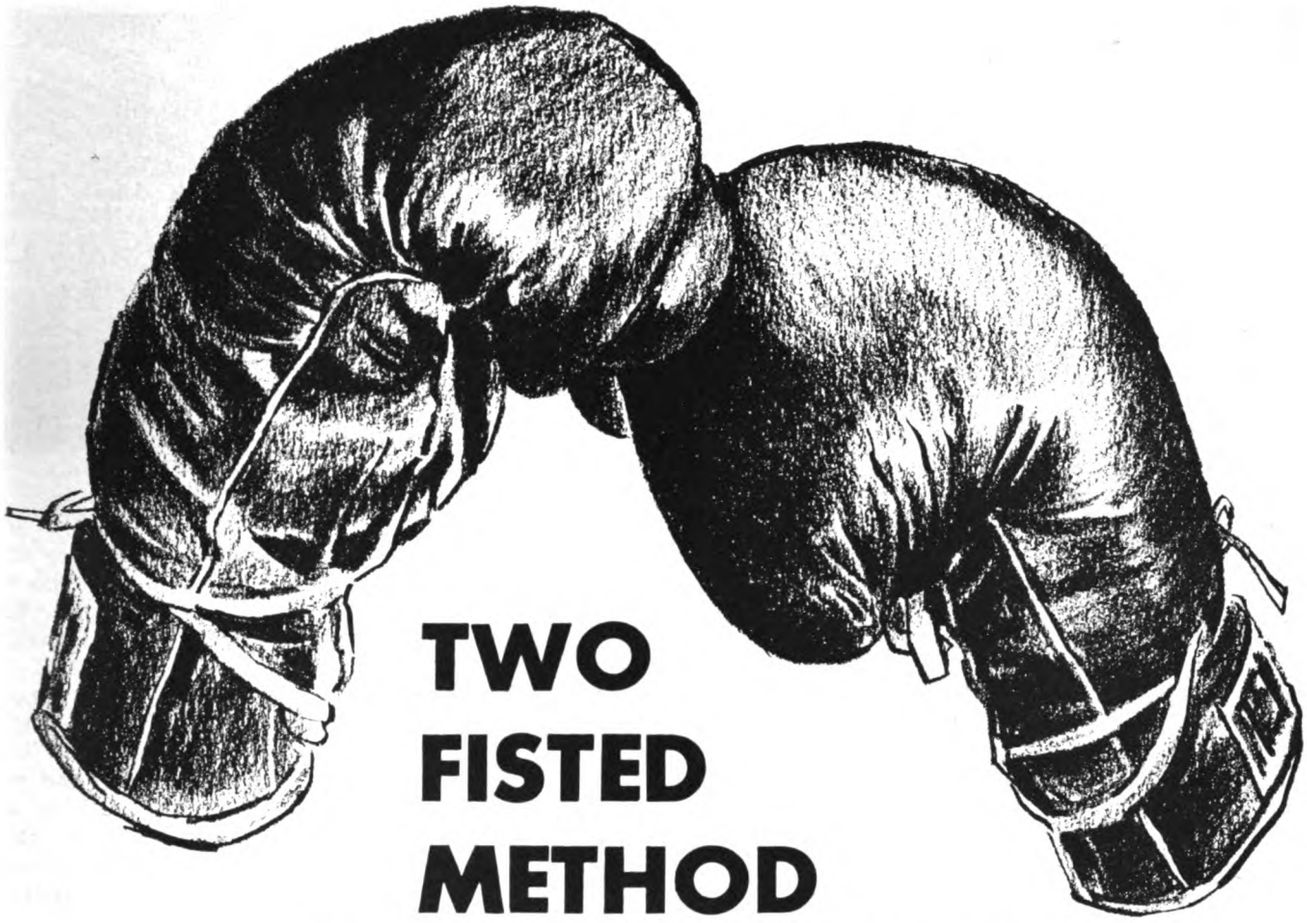
Recently, the GN placed in operation its new covered covered coach repair building. Tracks 8 and 9, which run through the building to the coach yard lead at both ends, were relocated and 625 ft of cover has been provided over each. The building is 78 ft wide. Each track will hold seven cars under cover. The building is a Butler prefab. The peaked gable roof design makes the building self-ventilating. Fourteen 30-in. standard gravity ridge ventilators remove the smoke and stale air. There are no supporting posts in the entire floor area. The floors are concrete and asphalt. Steam heat in the main working area is provided by overhead grid unit heaters equipped with electric fans.

Translucent Butler Lite Panels are used on the upper sides of the building and roof. Artificial lighting is provided by fluorescent fixtures and drop lights. Piping is installed for steam, water and air. Receptacles at convenient locations supply 220-volt a-c for welders and genemotors, 32-volt d-c for charging car batteries, and 110-volt a-c for extension lights and hand tools. Each track at the ends of the building has an electrically operated Kinnear door.

A 60-ft drop pit equipped with two Whiting electric drop hoists services both tracks. At the west end of the shop each track has a 100-ft inspection pit.

Adjoining the north wall, a service building, 416 ft long by 24 ft wide, houses all facilities previously scattered over the area. Each of the 12 rooms is formed by concrete block partitions and all have cement floors. Ceilings in all offices, lunch, locker and toilet rooms are furred down to 10 ft and ceilings and walls are plastered.

(Continued on Page 60)



TWO FISTED METHOD

CUTS PARTS CLEANING COSTS

The use of old fashioned cleaning materials and equipment is as wasteful as trying to work with only one hand.

Use the two-fisted Magnus method of parts cleaning instead, and strike a knock-out blow at constantly rising labor costs . . . the power-packed Magnus method, combining mechanical agitation with modern cleaners.

MAGNUS AGITATING CLEANING MACHINES

Save **LABOR, TIME, MONEY and MATERIALS**
. . . and do any cleaning job better

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Magnus offers a complete line of proved solvent and alkaline materials especially designed to meet the needs of the railroad industry and to get the best results from your agitating cleaning machine.

Write today for our free Railroad Cleaning Handbook on modern Magnus methods. Write Magnus, 77 South Ave., Garwood, N. J.

RAILROAD DIVISION

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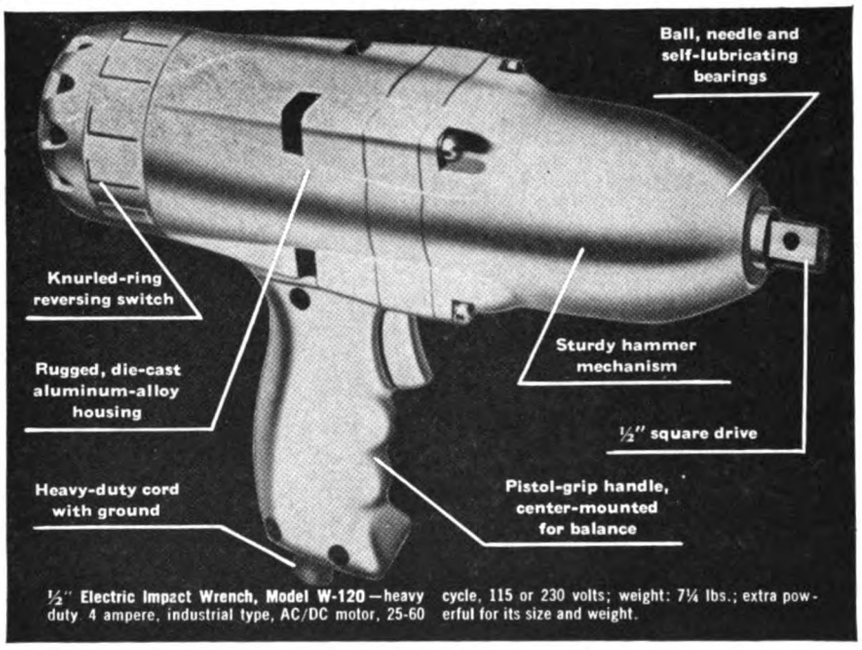
magnus a world-wide organization specializing in cleaning and protection of all surfaces.

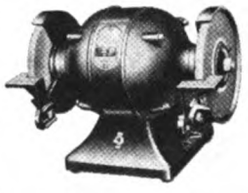
POWER to boost job efficiency with REMINGTON tools



½" **Electric Impact Wrench, Model W-120**—heavy duty 4 ampere, industrial type, AC/DC motor, 25-60 cycle, 115 or 230 volts; weight: 7¼ lbs.; extra powerful for its size and weight.

Non-reversible screwdriver, Model 143S—Capacity: No.10 wood screws; adjustable slip clutch; precision ball bearings; motor: 1.7 amp., 115 or 230 volts; locking trigger switch.

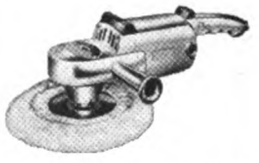
Reversible screwdriver, Model 143SR—Switch reverses rotation; adjustable clutch for preset tension; rating same as 143S; uses a wide range of finders, bits, attachments.



Electric bench grinder, Model BG-1—115-volt, ¼-hp AC motor, dynamically balanced, totally enclosed; wheel size: 6" x ¾"; sealed bearings; drilled for bench mounting.

Powerful, rugged, easy-to-handle Remington Power Tools help you boost output and ease the tough jobs. They're precision-built for long service and minimum maintenance. Your Remington Distributor stocks and services the industry's widest selection of quality power tools and parts.

⅜" **Electric drill, Model 381**—Compact design with all-purpose speed and rugged power; 800 rpm; 2.5 amps; precision Ball Bearings throughout; geared chuck and key.



Polisher, Model 57P—Capacity 9" bonnet; free speed: 1400 rpm; load speed: 840 rpm; 7.0 amps, AC/DC motor; 115 or 230 volts; heavy-duty precision ball bearings; wt., 19 lbs.

CHOOSE THE POWER MOST EFFICIENT FOR YOU. REMINGTON POWER TOOLS ARE AVAILABLE IN **AIR • ELECTRIC • GASOLINE-DRIVEN MODELS**

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Modern storeroom stocks repair material.

(*Continued from Page 58*)

About 50 to 75 cars are serviced in the coach yard and shop per day on a 3-shift, 7-days-a-week schedule. The total working force is 170 including clerks and foremen.

Machine tools include drill presses and small lathes. Duff-Norton air jacks are used to elevate coach bodies. Two Yale trucks, one Buda tractor and one Clark towing tractor are available for materials handling. Shop-made, wheeled adjustable height platforms enable workmen to perform all operations on sides and tops of cars.

The electric shop is equipped with a 2-ton Ingersoll industrial crane and a 1,000-amp, 45-volt GE charger. Klaxon horns signal the movement of cars along repair tracks. Three sets of double wheel storage tracks are installed inside the shop at the west end. Immediately outside, the mounted wheel storage tracks have a capacity of 50 pairs of wheels.

Servicing is done at the depot on through trains. This includes oiling, testing of air, icing, replacement of brake shoes, and insection of running gear and electrical equipment. During the winter, when terminating cars are covered with ice, they are brought direct to the heated service building. A deicer is used for removing extra heavy accumulations.

Shop repairs include maintenance of electrical heating and airconditioning equipment, and the changing of springs, wheels equalizers, brake beams and rods, center plates, and side bearings. Considerable heavy cleaning is performed and touch-up paint jobs are done either by spray or brush.

A routine sequence of operations has been developed in the shop. The cars are inspected, oiled and repaired, cleaned and then, watered and iced. They are then either placed on the outside tracks or dispatched directly.

How to put more life in your track

Here's a sound and practical plan
for cutting your M/W costs: install heat-treated rail!

Rail life increased 2½ to 4½ times on N & W

*As an example of the economies obtainable from heat-treated track, just listen to this excerpt from Railway Track and Structures:**

"The Clinchfield has been greatly interested in the performance of heat-treated rails installed on the Norfolk & Western . . . From this test installation, the AREA Rail committee concluded that rail life had been increased 2½ times (on the high-side rail) and 4½ times on the low sides of curves.

"As a result of these tests, the Clinchfield intends to procure 822 heat-treated 132-lb rails in 1958 to replace open-hearth rails of the same weight on 14-deg curves. Also, the road intends to adopt the heat-treated rails as standard for laying on all curves over 6 deg. Heat-treated rails are also being used for all stock rails of turnouts and for the rails which bind manganese-insert frogs."

Your road, too, can reap substantial savings with heat-treated rails and trackwork. Bethlehem, a pioneer in the field, offers you a practical and well illustrated catalog on heat-treated trackwork. Just fill out and send in the coupon below.

**March, 1958, p. 55*

Send Now for Informative Catalog

Bethlehem Steel Company
Publications Dept., Rm 1041-B
Bethlehem, Pa.

Please send me your Catalog 379, "Bethlehem Heat-Treated Trackwork." I would (would not) like to meet with a Bethlehem representative at this time.

Name_____

Railroad_____

Address_____

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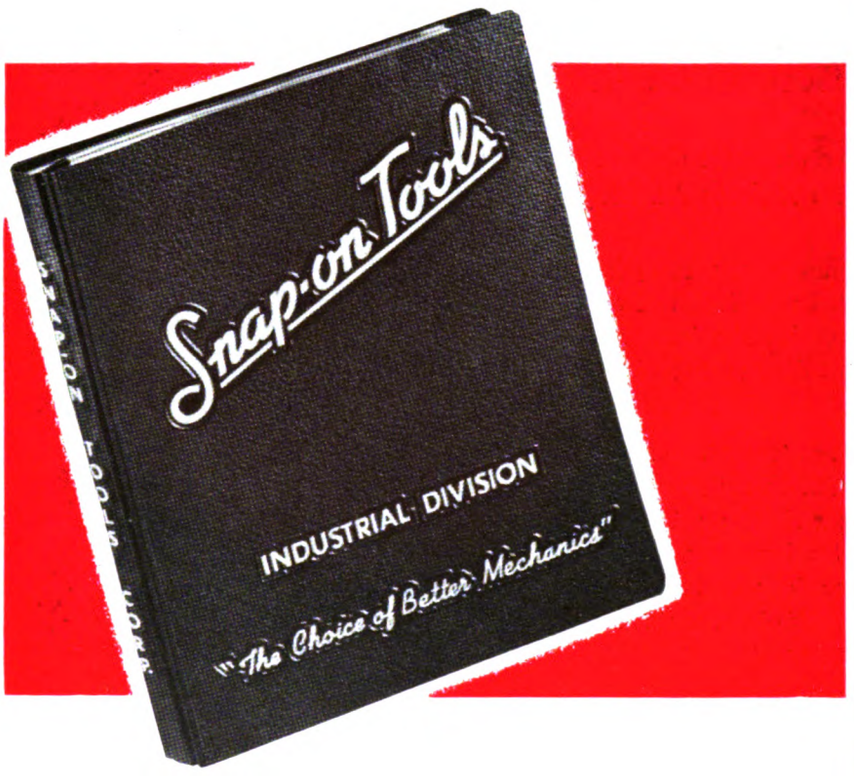
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

NEW Snap-on® Railroad Tool Catalog



Here is a complete, 156-page, hand tool buying guide for railroad purchasing agents, locomotive and car shop foremen, auto and truck fleet supervisors — anyone concerned with the use of hand tools for assembly, maintenance and service of rolling stock and off-track equipment.

Several special inserts show many tools specifically designed for railroad use — car and coach set, diesel locomotive set, diesel pipefitter's set, electrician and machinist sets, diesel air brake set and other special single tools.

This book is a handy order guide for purchasing heavy-duty and extra heavy-duty wrenches and sockets. Types and sizes are shown and specifications listed clearly.

Ask your *Snap-on* railroad representative for your free copy or write us direct.

SNAP-ON TOOLS CORPORATION
Railroad Division
8130-K 28th Avenue • Kenosha, Wisconsin

(*Continued from Page 28*)

signed as a three-dimensional curved truss. The truss, approximately four ft deep, is designed as a unit cell system of octahedra in which the involuted 11-gage sheet steel surface material is employed both as the weathering surface and as the inner member tension system of the truss.

The outer hexagonal array is composed of four-in. steel tube sections approximately nine-ft long, positioned with ¾-in. tension rods. The steel sheet fold lines repeat the geometry of the pipe and rod system.

The Bill of Materials for the Union Dome consisted of only seven items: standard ⅛-in. sheet steel; 4-in. pipe; 1½-in. and ¾-in. rods; 2-in. sleeves; 1½-in. nuts; and washers.

The outside surface of the Union Dome is painted bright yellow and royal blue. The panels are painted yellow so as to reflect heat on a sunny day, and thus accentuate their tendency to be in tension. The outer framework of pipes and rods is painted royal blue in order to absorb the heat and thus increase the compression tendency of the framework. The interior surface of the Dome is painted an off-white.

Lighting of the Union Dome is primarily artificial since the only place where natural light enters during the day is through a 4-ft opening at the apex of the Dome. The main source of light is a unique "Wheel of Light." It is 332 ft in diameter and consists of a circle of 106 color-corrected, 1,000-watt, mercury-vapor lamps. The "Wheel of Light" is suspended 34 ft above the work areas and follows the pattern of the radial tracks below. It provides 70 to 90 foot-candles of illumination for all work areas. Sixty additional lamps of this kind, with peach-colored filters, give the roof of the Dome a warm-toned indirect lighting effect.

The Dome and its circular, wheel-like repair operation provide a most efficient utilization of space; concentration of activity; coordination of all areas from one central location; ease of materials handling; and efficient use of modern equipment. The Dome was constructed because it is an economical and efficient shelter for such a high capacity tank car repair facility with its circular layout. Outdoor work, weather interruptions, and delays characteristic of conventional repair shops where work is deployed along a straight-line system are eliminated.

The Dome itself cost under $1,000,000, and the entire project cost slightly more than $3,000,000.

New SPERRY REFLECTOSCOPE cuts time and cost on axle testing

Designed specifically for railroad use, the Type US Sperry Reflectoscope offers a faster, simpler, more accurate and more economical means of testing. Axles can be tested "in place" on locomotives or cars, resulting in major maintenance economies by detecting hidden flaws before they cause costly failures or breakdowns.

The Sperry Reflectoscope offers these advantages:

Complete portability... weighs only 35 pounds

Low power consumption... built-in voltage regulation

Simplified four-knob control panel

New, completely transistorized plug-in alarm system... eliminates possibility of human error

Bright . . . easy to read video presentation

Sperry Reflectoscope Type US is another fine example of Sperry Rail Service's "engineering exclusively for railroads." If you're interested in cutting maintenance costs and achieving maximum equipment utilization, send for details of this outstanding inspection tool.

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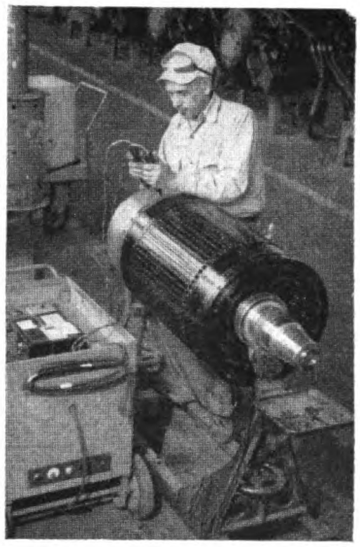

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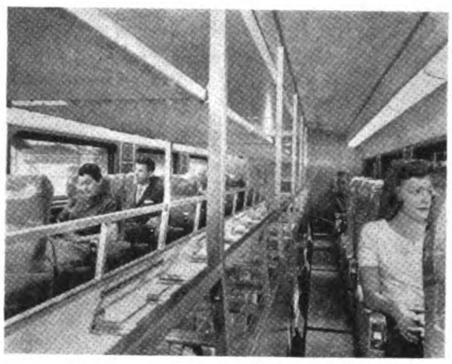
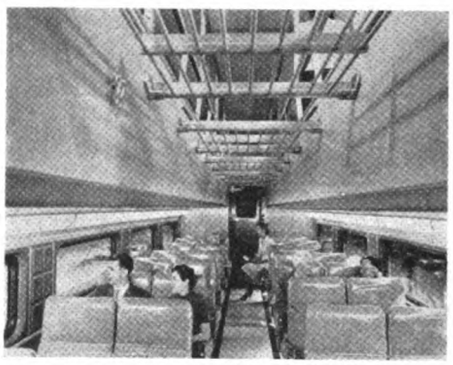
C&NW Bi-Level Trains



Single reclining seats on the upper level are proving attractive for passengers traveling alone.



Baggage racks for lower level, where 64 passengers can be seated, are located over center aisle.

(*Continued from page 32*)

main air ducts heat each of the new cars. Heating elements are also located under the vestibule steps to prevent icing.

The 8-ton self-contained cooling units are located in the compartment over the center-entrance vestibule. Each unit supplies and circulates cooled air for half of the carbody. Because all of the motors in this air conditioning equipment are driven by a-c, it is expected that maintenance will be simplified because brushes are eliminated.

Most of the interior surfaces of the cars are faced with integrally colored plastic. The reclining coach seats all are covered with zippered, synthetic-fabric seat covers. The C&NW actually got two sets to simplify cleaning and replacement. All windows are glazed with graduated-tinted safety glass. Shades are unnecessary. The four wheel trucks of all their cars are fitted with roller bearings and package brake units with Cobra shoes. The use of these package units has resulted in a weight reduction of 2½ tons per car.

Guide to lowest cleaning cost

Major cost in cleaning? *Man-hours.* How to cut them? *Modern-methods,* and the right *material.* This book tells about both. It's an authoritative guide to the lowest cost-per job.

Divided into eight basic railroad cleaning categories, it details specific procedures and materials for such jobs as cleaning car exteriors ... running gear and trucks ... cooling systems ... parts ... and many, many more.

Write Oakite Products, Inc.
46 Rector St., New York 6, N.Y.

In our 50th year

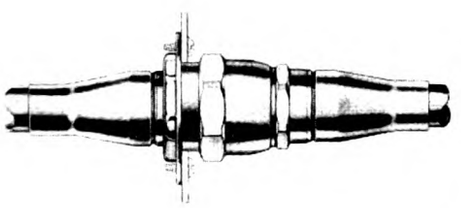
SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE
SCIENCE

RAILROAD DIVISION

Export Division Cable Address: Oakite

(*Continued from page 16*)

24¼ in. deep, and weighs 100 lb. It has four lower drawers, each 6¾ in. deep, 21 in. wide, and 15¼ in. long, and two top drawers, each 1⅝ in. deep, 21 in. wide, and 15¼ in. long. The parts storage section mounted on top of the drawer section has 18 compartments. In front of this section is a 24½-in. x 13-in. work area. This space can also be used to transport bulky replacement parts, motors, etc. A 1-in. high lip prevents tools or parts from sliding off. *Snap-On Tools Corporation, Dept. RLC, 8028 28th ave., Kenosha, Wis.*



Improved Refrigerant Coupling

A greatly improved self-sealing coupling, the 5500 Series, has been developed primarily for commercial and residential air-conditioning and refrigeration units where evaporator and condenser sections are built separately. It is suitable for use with numerous refrigerants, including F-12 and 22 and similar compounds.

The 5500 coupling permits factory testing and precharging of air conditioners. They can then be shipped and stored fully charged with refrigerant, substantially reducing field installation time and costs. The coupling is leakproof; when disconnected, the coupling halves seat tight to prevent loss of refrigerant and admission of air or foreign particles into the refrigerant system. *Aeroquip Corporation, Dept. RLC, Jackson, Mich.*

Petroleum Pumps

"Big-Flo" high-capacity submersible pumps are for use in underground storage tanks, tank farms, terminals and on railroads. They have 1-, 1 ½-, 2-, 3-, and 5-hp motors, a capacity to 260 gpm, and will handle any petroleum products practical to pump, including gasoline, fuel oil, diesel oil and kerosene. All pumps will fit through a 6-in. tank opening. The motor shaft and pump are direct driven, and the entire unit is lubricated by the fluid pumped. Vapor lock is said to be eliminated because the fuel is under pressure from the pump in the tank to the discharge nozzle.

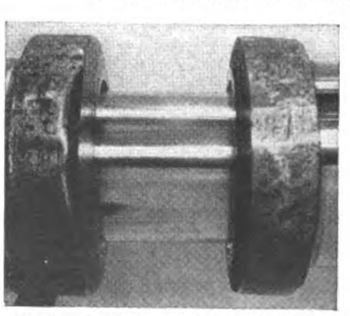
Other features include windings hermetically sealed in stainless steel, simple plug-in connection between motor and lead wires, self-equalizing and self-leveling thrust bearing

THIS CRANKSHAFT JOB NEEDS A SPECIALIST

This is specialized work, rebuilding crankshafts—intricate, exacting, and naturally expensive. It's the kind of work that demands a specialist . . . and we are just that!

We've specialized in rebuilding crankshafts, because since 1911 we've *made* crankshafts. And who knows better than a maker what are the "musts" of a sound, economical repair job. We'll take your worn crankshaft and rebuild it, if salvagable, through the carefully controlled steps of grit blasting, replating, regrinding and thorough inspection. And we'll deliver it back with a guarantee for 100% performance that only a manufacturer-specialist can provide. May we quote on your next job?

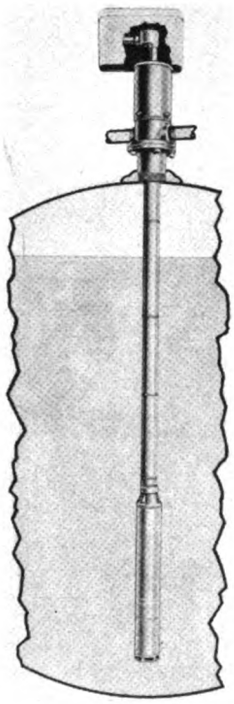
For more details on crankshaft repair write for Bulletin RC 1



This is a finished, repaired crankshaft, after processing by National Forge.

NATIONAL FORGE AND ORDNANCE COMPANY

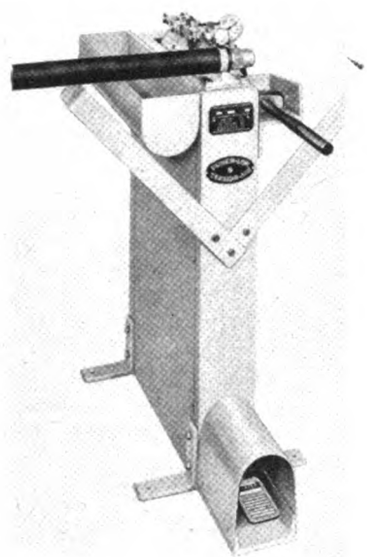
Irvine (Warren County), Pa.



and stainless steel motor shaft. A device in the motor protects against all conditions of overload, and automatically stops the motor if the tank pumps dry. *Red Jacket Manufacturing Company, Dept., RLC, P.O. Box* 270, *Davenport, Iowa.*

Hose Clamping Machine

A hose clamping machine, Tension-Air Model TA-1, makes possible uniform clamping through pre-selected air-pressure which actuates the clamping tool. The complete operation consists of placing the hose and the clamp in the machine and stepping on a pedal. The clamp is then locked securely with a single mallet blow and the tail piece is broken off flush with the Lok by a twist of the wrist. The machine is also fitted with a clamp remover. *Punch-Lok Company, Dept. RLC, 321 N. Justine st., Chicago 7.*



Dual Range Therm-O-Meter

A dual range Therm-O-Meter with a self shielded core magnet meter movement is designed for measuring temperatures of gas, liquid, or solids used in air-conditioning, heat

America's foremost engineered lettering tools

designed to reduce your present costs 50 to 80%

Used today by 1/3rd of the Nation's leading Railroads . .

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Easy to apply. No skill required. Produces the most accurate and durable type of lettering, numerals, medallion, and other types of markings. Adds long life to your identification or advertising on all your equipment . . .

Whatever your lettering problems may be regarding identification, advertising, reflective or non-reflective, the DEMP-NOCK LETTERING SYSTEMS can help you get the job done in less time.

For additional information write Dept. RR-100

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ıg, refrigeration, freezer storage, etc. Model 89-3L has two ranges—a low from —50 to 00 deg F, and a high from 100 to 250 eg F. It can accommodate three leads simltaneously with separate readings through ne selector switch on the front of the instruıent. Readings are made in a matter of econds. Overall accuracy is plus or minus deg F in any position; at near center, ıithin plus or minus 2 deg F. *Simpson Electric Company, Dept. RLC, 5200 W. Kinzie t., Chicago 44.*

ıupply Trade Notes

(*Continued from page 10*)

Thompson, railroad sales manager, resigned, ıssigned to *L. C. Morris,* assistant sales nanager.

■

NTERNATIONAL NICKEL COMPANY.—*Albert P. Gagnebin* elected a vice-president ınd *Joseph M. Weldon* an assistant vice-ɔresident.

Edgar K. Lofton

SKF INDUSTRIES, INC.—*Edgar K. Lofton,* 700 Cambridge Road, Bala Cynwyd, Pa., appointed field engineer to service railway accounts in eastern United States.

■

JERSEY BOLT & SPIKE CORP., FLANNERY PRODUCTS DIVISION.— Jersey Bolt & Spike Corp., Newark, N. J., has acquired the manufacturing facilities of the Flannery Bolt Company which is now the Flannery Products Division of Jersey Bolt. Operations of Flannery Bolt being transferred from Bridgeville, Pa., to 8 Lister ave., Newark.

■

THERMO KING CORPORATION.—General offices, engineering and service departments being moved from 44 South 12th street, Minneapolis, to Bloomington, Minn., plant where a new addition has been opened at 314 West 90th street.

■

K W BATTERY COMPANY.—*William T. Bardouski* appointed sales representative, western Illinois and eastern Iowa.

■

BUFFALO BRAKE BEAM COMPANY.—*Elmer E. Burk* appointed general manager at Lackawanna, N. Y.

■

PULLMAN-STANDARD CAR MANUFACTURING COMPANY.—*J. W. Miller* appointed assistant vice-president in Birmingham, Ala., sales office.

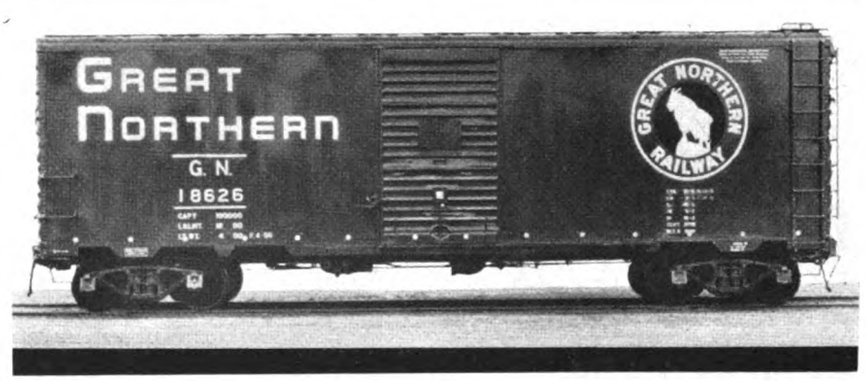
For Restoring B and C Floors

GREAT NORTHERN

is using time-proven

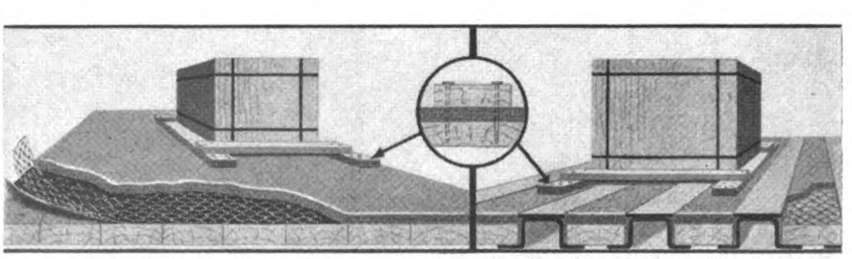
Plastinail*

Nailable Cement Flooring



REPORTS THE GREAT NORTHERN: *"We made our first tests with Plastinail back in 1949. Since that time we have Plastinailed several hundred cars with very satisfactory results."*

Do you have the Plastinail story? Applied to a sound B or C floor, it will provide 7 or 8 years or more of Class A service. And it's a better floor — smooth, inorganic, non-absorptive, easily prepared, nailable. Yet, Plastinail costs less than a new wood floor. The first cost is less. And the service is supreme because wood and Plastinail is 79% stronger than wood alone.



Plastinail Nailable Cement Floor in standard box car

Plastinail Nailable Cement in conjunction with steel as an original floor

F. E. SCHUNDLER & COMPANY, INC.

504 Railroad St. **Joliet, Illinois**

PRIME MANUFACTURING COMPANY. —*J. E. Vaughan* elected president to succeed *H. G. Wild,* who continues with company as vice-president and treasurer. Mr. Vaughan previously secretary in charge of manufacturing and purchasing. *William H. Welty* appointed vice-president in charge of sales.

■

ALCO PRODUCTS, INC.—*Robert G. Koob,* district service manager, appointed transportation products sales representative at New York, succeeding *James L. Layton,* transferred to Los Angeles. *T. E. Fryar,* assistant renewal parts manager at Los Angeles, appointed renewal parts and warehouse manager.

■

SPRING PACKING CORPORATION.—*Robert E. Waller* elected vice-president and treasurer.

■

SHELL OIL COMPANY. — *Thomas R. Charlton* appointed regional manager, Railway Sales Department, Chicago, succeeding *L. L. Butcher,* retired.

■

GENERAL MOTORS CORPORATION, ELECTRO-MOTIVE DIVISION — *Harry E. Schneider,* manufacturing manager of Plant Two, Chicago, appointed manager, succeeding *Edgar W. Lister,* retired.

■

JOSEPH T. RYERSON & SON, INC.—*Paul J. Fountain,* assistant manager of stainless steel sales for the Boston plant named manager of stainless-steel sales, replacing *Philip B. Van Horne,* now consultant, stainless sales.

CHROMIUM CORPORATION OF AMERICA.—*George O. Whitesell* appointed sales and service engineer for railroads in the southeastern and eastern United States. Mr. Whitesell formerly with Oakite Products, Inc.

■

ALAN WOOD STEEL COMPANY.—*James F. McCrudden, Jr.,* appointed district sales manager in charge of New York office.

■

WESTERN INDUSTRIES, INC.—Activities previously contained in four separate buildings have now been consolidated at 2726 W. 36th Place, Chicago.

■

JOY MANUFACTURING COMPANY.—Boston branch office formerly at 88 Brookline avenue, now at Second avenue, Burlington, Mass.

■

A. M. BYERS COMPANY.—*Calvin L. Wright* appointed field service engineer at Baltimore, Md., succeeding *V. H. Ross,* retired. *Robert B. McQuarrie* appointed Northwest Coast field service engineer, with headquarters in Russ Building, San Francisco.

■

OAKITE PRODUCTS, INC.—*George M. Seib,* secretary, appointed vice-president.

■

GOULD-NATIONAL BATTERIES, INC.—*W. H. Mowers* appointed railroad sales representative, Industrial Division, with headquarters in New York.

MCGRAW-EDISON COMPANY. — *E. Woodward Allen,* vice-president of Thomas A. Edison Industries, and manager of engineering, Storage Battery Division, has retired.

■

AIR REDUCTION SALES COMPANY, A DIVISION OF AIR REDUCTION COMPANY.—*Fred T. Wilson, Jr.,* appointed manager at New Orleans. *E. C. Kennedy* succeeds Mr. Wilson as assistant manager-sales at New Orleans.

■

SCULLIN STEEL COMPANY.—*Thomas W. Pettus,* executive vice-president, appointed president.

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

PORTABLE DC HYPOTS. Bulletin 5-1.2, "DC High Potential Tests to 30,000V," details full specifications and specific application data of some 15 DC Hypot models covering output ranges of 5, 10, 20 and 30 KV DC. (Write: *Associated Research, Inc.,* Dept. RLC, 3777 West Belmont ave., Chicago 18.)

HARD SURFACING ELECTRODES. "New Hard Surfacing Fact File," on 3 x 5-in. cards, gives data on Murex line of 88 types and sizes of Hardex hard surfacing electrodes and rods. (Write: *Metal & Thermit Corp.,* Dept. RLC, Rahway, N.J.)

GENERAL PRODUCTS. 88-page catalog, lists, in concise form, diverse activities of Ex-Cell-O Corporation, which include boring machines, grinding machines, railroad pins and bushings, cutting tools, drill jig bushings, etc. (Write, on company letterhead: *Ex-Cell-O Corporation,* Dept. RLC, 1200 Oakman Blvd., Detroit 32.)

COUPLER PARTS. Coupler Parts Catalog No. 12858 shows in actual photographs all AAR standard coupler parts, yokes, and associated yoke parts. Lists also Standard coupler shanks, bushings, and maintenance gages. (Write: *Railway and Mine Division, National Malleable & Steel Castings Co.,* Dept. RLC, 10600 Quincy ave., Cleveland 6.)

INSULATION ADHESIVES AND SEALERS. 4-page folder describes four typical applications of adhesives for bonding insulation and insulating sealers for the heating, ventilating, railroad, and other industries. Chart lists properties, uses, application methods, and coverage of the adhesives and sealers. (Write: *Adhesives, Coatings and Sealers Division, Minnesota Mining & Manufacturing Co.,* Dept. RLC, 423 Piquette ave., Detroit 2.)

CABOOSE POWER SUPPLY. 4-page bulletin, GEA-6630, describes new 1-kw packaged power supply for railway caboose radio

Eastern Car Maker Saves with ARCAIR

One of the largest manufacturers of railway rolling stock has adopted the Arcair process as standard procedure for defective weld removal, after exhaustive test evaluation.

Now Arcair torches using 1/4" Copperclad electrodes are gouging out imperfect welds in just 1/3 the time formerly required. And re-weld is easier with surfaces Arcair-clean and Arcair-smooth.

Operators like Arcair for ease of control and versatility of operation. Arcair does not "lose the groove" or damage the parent metal on either side.

You'll like Arcair savings, too! Basic simplicity—electric arc plus ordinary compressed air — makes Arcair the new, efficient, cost-cutting answer to your metal removal problems.

Write today for complete information!

Arcair Metal Removal Torches

474 S. Mt. Pleasant St., Lancaster, Ohio

communications, electrical marker lighting, and interior lighting. Shows how unit operates and includes schematic diagram, performance curve, outline dimensions and specifications. (Write: *General Electric Company*, Dept. RLC, Schenectady 5, N.Y.)

WELDING SUPPLIES AND ACCESSORIES. 52-page catalog, Form ADC 848C, covers Airco's complete line of fluxes and ferrous and non-ferrous rods for gas welding and accessory items, such as protective clothing, goggles, electrode holders, weld cleaning tools, etc., both for arc and gas welding. (Write: *Air Reduction Sales Company, a division of Air Reduction Company*, 150 E. 42nd st., New York 17.)

UNIVERSAL LOCOMOTIVES. Colorful booklet describes in detail G-E universal-type diesel-electric locomotive designed for all types of service in all parts of the world. Three-page four-color fold-out shows all components of a typical locomotive. Gives data on universal's four-cycle diesel engines, their electric drive traction motors and high-speed trucks, and basic specifications on six currently available models ranging in size from 990 to 1,980 gross horsepower. (Write—on company letterhead: *Transportation Sales Department, International General Electric Company*, Dept. RLC, 150 East 42nd st., New York 17.)

FREIGHT LINER. 4-page folder describes "3 quick steps to a superior coating. . . ." for covered hopper cars through the use of Freight Liner 410, a white plastic coating. (Write: *Archer-Daniels-Midland*, Dept. RLC, 700 Investors Bldg., Minneapolis 2.)

FLEXIBLE CORDS AND PORTABLE CABLES. 64-page Bulletin 1108 gives dimensional data, engineering information, and splicing and terminating instructions on Okonite's line of mold-cured Okoprene (neoprene) sheathed cords and cables. (Write: *Okonite Company*, Dept. RLC, Passaic.)

HAND OPERATED CRANES. 4-page folder DH-455-B. Gives technical data, specifications, and operating features of type B-36 underslung single bridge, hand-operated cranes with capacities of 1 to 10 tons and spans up to 50 ft. (Write: *American Chain & Cable Co.*, Dept. RLC, 929 Connecticut ave., Bridgeport 2, Conn.)

JOURNAL LUBRICATOR. 6-page bulletin gives construction details and installation data on new Cool-Pak journal lubricator. Answers 16 questions railroad men ask about it. (Write: *UniPak Corporation*, Dept. RLC, Box 8302, Pittsburgh 18.)

SAFETEE SOLVENTS. Specification sheets, bound in catalog form, outline new and unusual applications of Safetee solvents, complete specifications given for each product. (Write: *Fine Organics, Inc.*, 211 E. 19th st., New York 3.)

ENGINE MODERNIZATION. 6-page Bulletin 2010 lists "10 reasons why you should modernize your VO diesel locomotives engines the Baldwin way." Modernization of other engine parts also discussed. (Write: *Baldwin-Lima-Hamilton, Eddystone Division*, Dept. RLC, Philadelphia 42.)

NEW! A 35 Ton Hydraulic Journal Jack

First in the Industry!

You asked for it and here it is—a brand new jack designed and built especially for servicing heavier freight cars. It can raise 35 tons 6 inches—is only 9.7 high—weighs but 55 pounds. With the 35H9.7, the job of inspecting and renewing journal brasses can now be done without the danger of overloading a lower capacity hydraulic journal jack—and the work can be done faster with less effort! If you have the problem of lifting heavy cars, we suggest you get complete details on this new 35 ton hydraulic journal jack immediately. Write the world's oldest and largest manufacturer of lifting jacks for bulletin AD-16-G.

DUFF-NORTON COMPANY

P. O. Box 1889 • Pittsburgh 30, Pennsylvania

COFFING HOIST DIVISION • Danville, Illinois

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Ratchet, Screw,
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C. L. COMBES
Signature of editor

Sworn to and subscribed before me this 23rd day of September, 1958.

EDMUND J. PUYDAK

[SEAL]

(My commission expires March 30, 1959)

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Arcair Company 68

Beatty Machine & Mfg. Co. 58
Bethlehem Steel Co. 61
Biddle Company, James G. 64
Broderick & Bascom Rope Co. 45
Buckeye Steel Casting Co., The 41

Columbia-Geneva Steel Division,
U. S. Steel Corp. 57

Demp-Nock Company 66
Douglas Fir Plywood Association 8, 9
Duff-Norton Mfg. Co. 69

Electro-Motive Division
General Motors Corporation 38, 39
Esso Standard Oil Co. 51

Farr Company 21

General Steel Castings Company 11

Holland Company 15

Linde Company, A Division of
Union Carbide Corporation 6, 7
L. O. F. Glass Fibers Company 4
Lord Manufacturing Company 13

Magnus Chemical Co. 59
Magnus Metal Corporation 24
Mall Tool Co., Div. of Remington Arms,
E. I. Dupont De Nemours & Co. 60

National Aluminate Corporation ..... Inside Back Cover
National Carbon Company,
Div. of Union Carbide Corp. 49
National Electric Coil Company 3
National Forge and Ordnance Co. 65
National Malleable & Steel Castings Co. 22, 23

Oakite Products Co. 64

Schundler & Co., Inc. F. E. 67
Sinclair Refining Company 42, 43
Snap-On-Tools Corporation 62
Sperry Rail Service,
Division of Sperry Products, Inc. 63
Stackpole Carbon Co. 52
Statement of Ownership 70
Stran-Steel Corporation,
Unit of National Steel Corporation 53

Texas Company ..... Inside Front Cover
Timken Roller Bearing Company ..... Back Cover

Union Carbide Corporation,
Linde Company Division 6, 7
Union Carbide Corporation,
National Carbon Company 49
United States Steel Corporation,
National Tube Div. 57
United States Steel Export Company,
U. S. Steel Corp. 57
United States Steel Supply Division,
United States Steel Corporation 57

Wine Railway Appliance Co. 35
Wix Corporation 47

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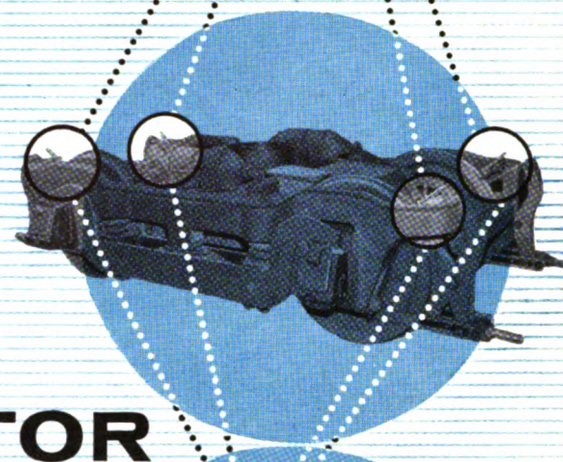

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USING Nalco "MOLY" STICKS

Nalco "Moly" Stick is a highly-efficient *dry* lubricant that maintains a lubricating surface between locomotive wheel flanges and track under extremes of pressure and temperature . . . without *picking up dirt and sand to form a grinding compound.* In new Nalco Type TA Lubricators, "Moly" Sticks provide automatic flange lubrication that has extended wheel life from a substantial 30% to as much—particularly on yard locomotives—as a whopping 300%!

Cost of Nalco Type TA Lubricators and "Moly" Sticks is small. Maintenance is limited to occasional stick replacements. Complete installation of lubricators on a diesel unit can be done by your shop personnel in four hours or less.

Call or write for details on the simplicity and continuing economy of Nalco Flange Lubrication for your locomotives.

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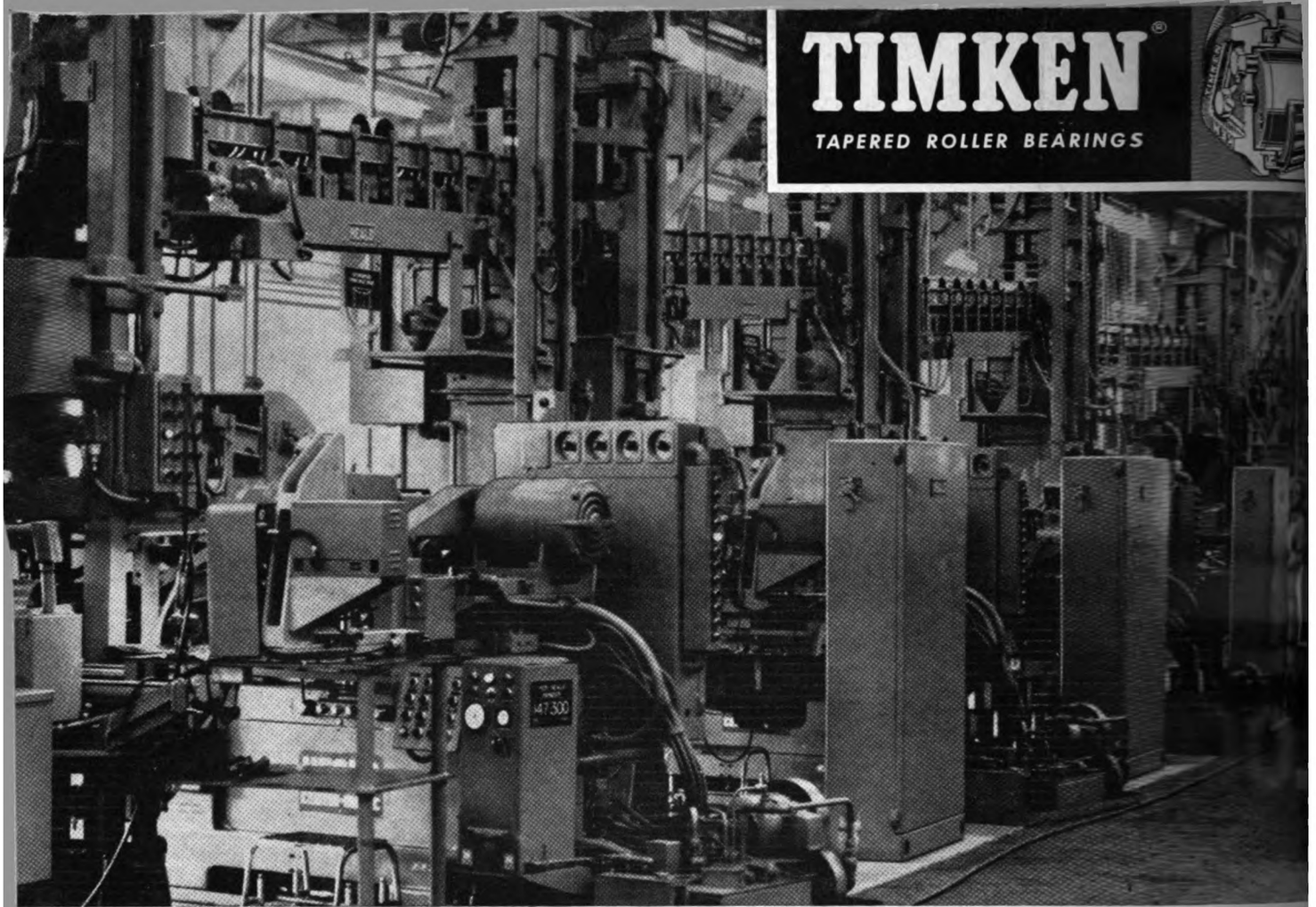


This ultra-modern roller bearing plant can help you pl
right now TO SAVE $288,000,000 A YEA

YOU'RE looking at a section of our amazing new $7,500,000 roller bearing plant at Columbus, Ohio. It turns out Timken® tapered roller bearings for freight cars only. Those ultra-modern machines (above) can mass-produce 20,000 car-sets a year—keeping costs down.

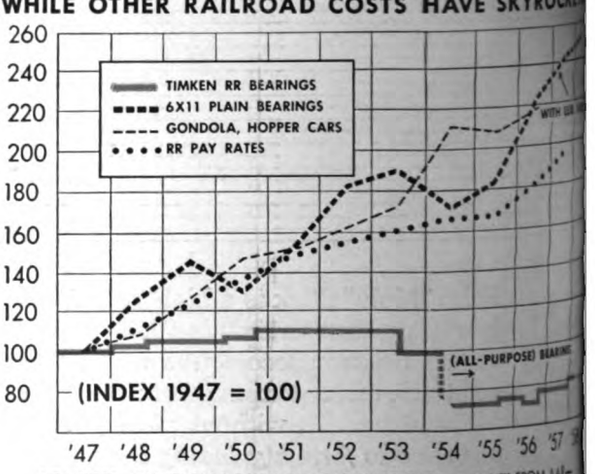
This plant is ready now to help you put *all* your freight cars on roller bearings. These "Roller Freight" cars will enable the railroads to slash their maintenance and operating costs by $288,000,000 a year—$144 per car! And if other costs keep going up (see chart at right), the investment you make in roller bearings today will pay off even more in years to come.

The best time to start these savings rolling in is right now. One smart way is to get together with the other railroads and *plan* your Timken bearing purchases, order a specified number every year. You'll not only establish more economical shop schedules—but also minimize your roller bearing costs. For example, the chart at right shows how the cost of friction bearings and other things a railroad uses have gone steadily upward while the cost of Timken roller bearings has come down and down. Keeping bearing costs down will be the automatic result of our new plant as you go "Roller Freight" on a planned basis.

Ask your maintenance and operating people what they think of "Roller Freight". One railroad's freight cars equipped with Timken roller bearings rolled over 300,000-000 car-miles with only *one* overheated bearing. On another line, Timken-bearing-equipped cars recently rolled 216,000 miles each over a 3-year period *without adding lubricant.*

Savings like these show why Timken bearings give 24½% return on the investment—why 69 railroads

TIMKEN BEARING COSTS HAVE STAYED DOWN WHILE OTHER RAILROAD COSTS HAVE SKYROCKE

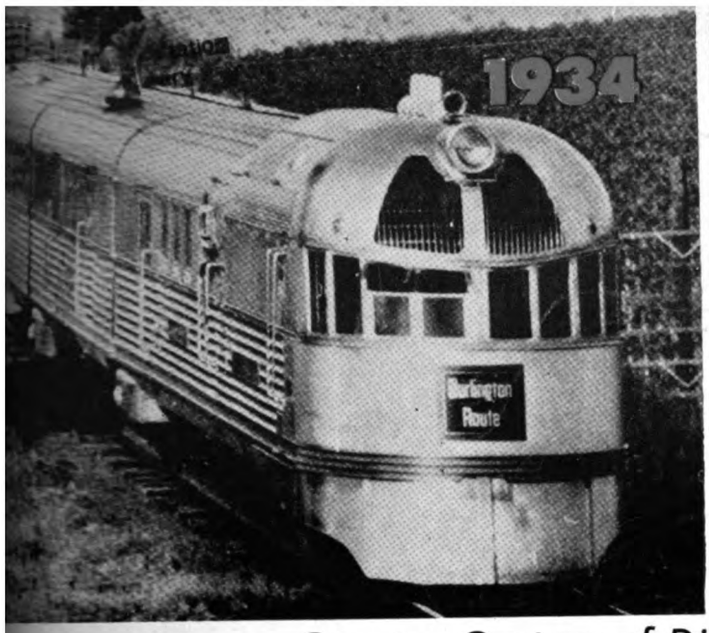


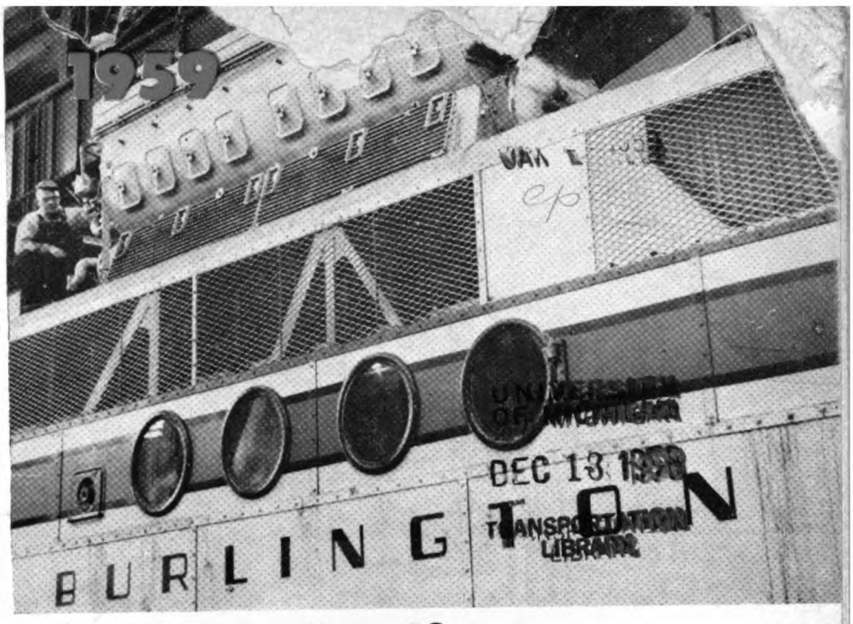
SOURCES: AMERICAN RAILWAY CAR INSTITUTE • INDEX FROM AAR-ICC STUDY • AAR INTERCHANGE RULES

other car owners already have over 25,800 freight on Timken roller bearings.

Start right now planning your "Roller Freight" moder zation and new car program. Start switching to Timk roller bearings and take full advantage of your new ro bearing production line—the most modern in the wo The Timken Roller Bearing Company, Canton 6, Oh Cable: "TIMROSCO". Canadian plant: St. Thomas, Ont

"Roller Freight" is the next great step in railroadin





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Quarter Century of Dieselization . . . . . Page 19

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Burlington Builds Its Own . . . . . Page 30

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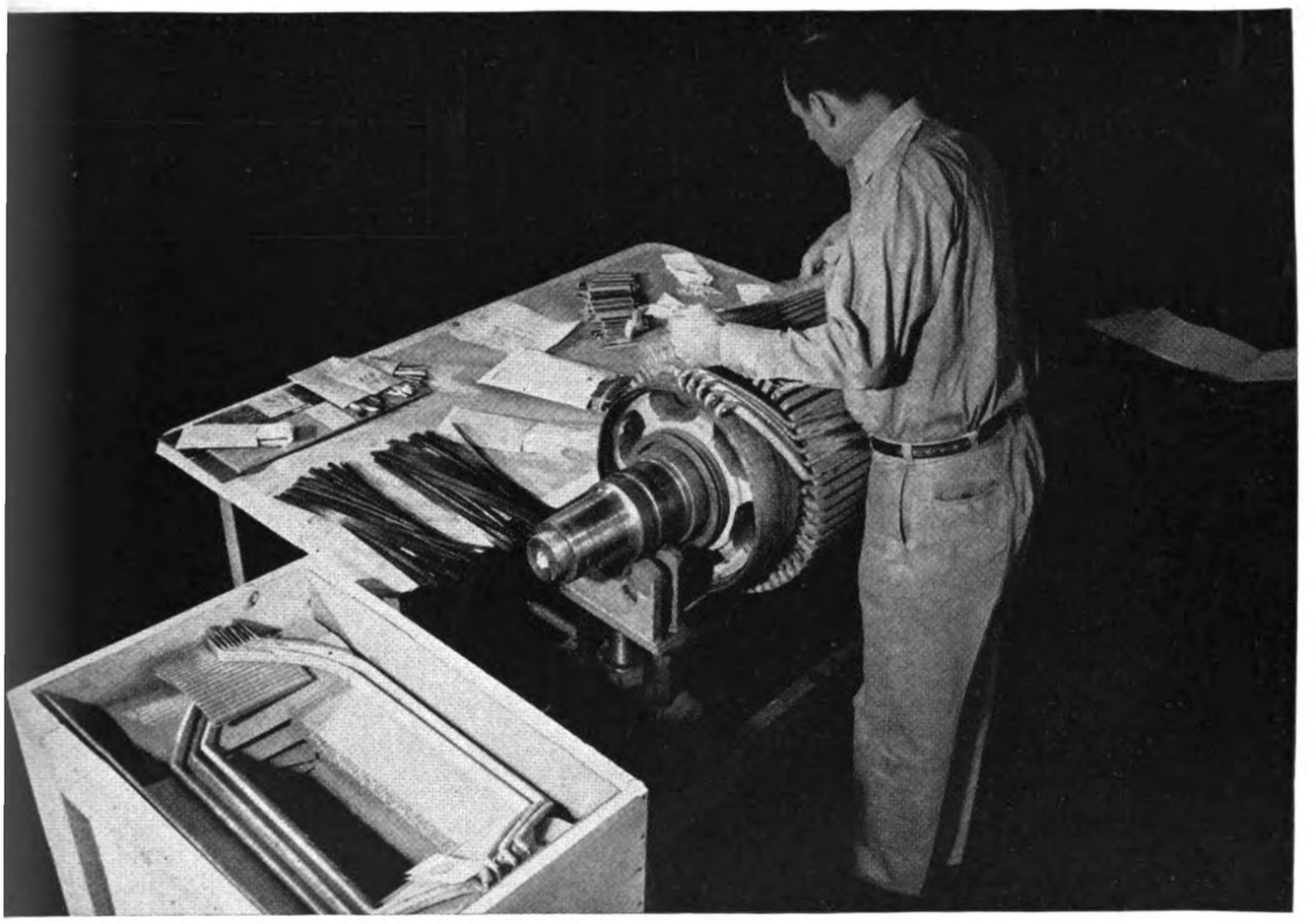

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ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION—
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

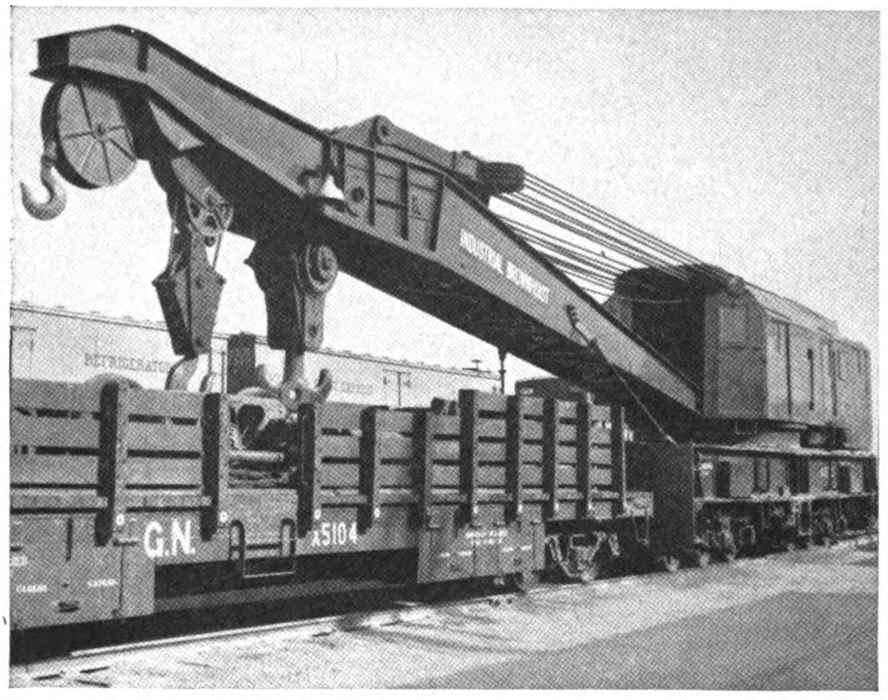
The Engineer's Field Report

CASE HISTORY

PRODUCT Chevron Starting Fluid

FIRM Great Northern Railway, Havre, Montana

Special fluid starts 250-ton crane instantly, saves time in emergencies—even at 50° below

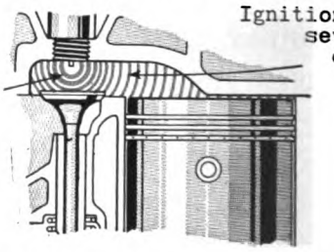


GREAT NORTHERN RAILWAY'S 250-TON, RAILROAD CRANE (above) starts instantly with Chevron Starting Fluid in temperatures ranging to 50° below zero—even after standing idle for months at a time. Former steam-powered wrecker equipment took crew 12 hours to start. This crane with its two 174 h.p. Cummins diesel engines is now available for derailment emergencies on short notice.

"Slow-grind starts on battery power alone waste too much valuable time. Chevron Starting Fluid fires these engines 'right now'—in any weather." A Great Northern engineer shows how simple it is to insert 7CC gelatin capsule of Chevron Starting Fluid in unit's air-intake system. Fluid is also available in 17CC capsules and 1-pint cans.

Why Chevron Starting Fluid starts engines instantly

Highly volatile: 7 times more than gasoline



Ignition temperature several hundred degrees lower than diesel fuel

Contains wear-reducing lubricants

Additives inhibit ice formation

CHEVRON

FREE FOLDERS tell more about the Chevron Starting Fluid and Chevron Pressure Primer System. Write or ask for them.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies listed below.

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MASTER-SEND FORM 3579 TO EM- ST., BRISTOL, CONN.

REPORT FOR DECEMBER

Turbines and Diesels In Multiple

Union Pacific's turbine No. 61 has been coupled to two GP-9's. Two other 4,500-hp turbines are running coupled back-to-back in multiple. Three GE 7,000-hp units are now in service.

Proper Oil Level in Journal Boxes Equipped with Lubricating Devices

The AAR Mechanical Division in a recent circular has issued the following instructions to serve as AAR Recommended Practice at this time insofar as journal boxes equipped with journal lubricating devices.

"If any free oil is visible in the bottom of the journal box, no further oiling is necessary. However, if there is no indication of free oil in the bottom of the journal box, a sufficient amount of oil should be added to leave ½ in. of free oil in the bottom of the box.

"This does not apply to boxes equipped with Hennessy mechanical type 'AR' and 'ARX' lubricators which should have the oil level maintained to the top of the oil gauge in accordance with the manufacturer's instructions, nor does it change existing instructions with respect to maintenance of oil level in journal boxes using waste packing."

It is to be understood that this circular is not intended to discourage the necessary practice of free oiling of journal boxes, but rather to discourage the habit in some locations of putting too much oil in such boxes, thereby resulting in waste and splashing of oil on rails which is detrimental to train operations. The AAR suggests these instructions be placed in the hands of all forces concerned with the free oiling of journal boxes.

Riveted Type Coupler Yokes

The Arbitration Committee of the AAR has extended the effective date of replacement of riveted type coupler yokes with cast steel yokes from March 1, 1958 to January 1, 1960. The committee requests the quarterly reports covering replacements be continued during 1959. It is expected that no further extension beyond the above date will be granted.

Miscellaneous Publications

REFRIGERATOR CAR RESEARCH.—AAR Mechanical Research Division Report MR-289 discusses seven factors related to establishing a standard floor rack height for refrigerator cars equipped with overhead fans. By using known information on air pressure loss in rectangular ducts and referring to electric fan performance data in Report MR-230, the effect of floor rack height on the volume of air flow within a refrigerator car can be calculated. *W. M. Keller, vice-president, Research Center, Association of Amer-*

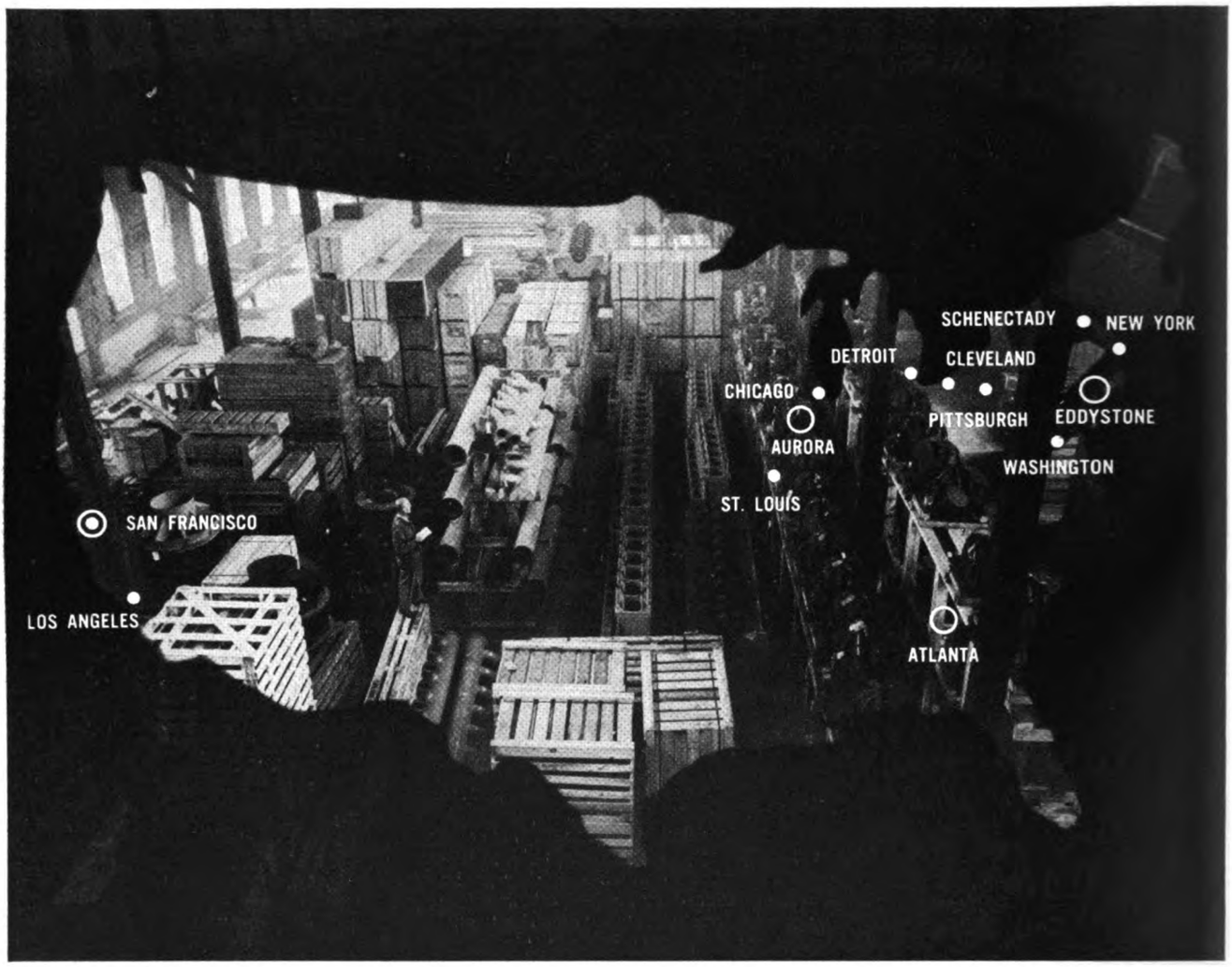
(Continued on page 8)

SPECIAL REPORT: BURLINGTON MECHANICAL DEPARTMENT

No "Let Up" in CB&Q Equipment Maintenance 19
CB&Q Goal: Doing Job Better Than It Has Been Done 20
Burlington Equipment Investments Pay Off 22
Scheduled Maintenance and Controls Assure Reliability 25
Burlington Builds Its Own Freight Cars 30
Diesels Are Shopped on Time Basis 30
"Q" Keeps Its Cars on the Move 46
Burlington Electrical Practices Are Sound 50

DEPARTMENTS

Report 5
What's New in Equipment 12
Personal Mention 56
Supply Trade Notes 57
Electrical:
Shop Time Saver 54
Diesel Maintainers Note Book ... 54
Helps from Manufacturers 63



● Sales Offices ○ Renewal Parts Warehouse

Shown above is one of the huge diesel parts warehouses at Eddystone

Just a word from you sets the wheels in motion... and Baldwin diesel renewal parts are on their way!

Today, as always, Baldwin provides the ultimate in both parts and service for its thousands of diesel locomotives throughout the world. Only from us can you get exact duplicates of the original components of your Baldwin locomotive. Each Baldwin renewal part is made, like the original, by skilled workers and to the same high standards to assure you longer, trouble-free performance.

Swift service on Baldwin diesel parts is supplied by four strategically located warehouses, all geared for immediate handling of your needs. And remember that there is a nearby B-L-H district sales office always at your service.

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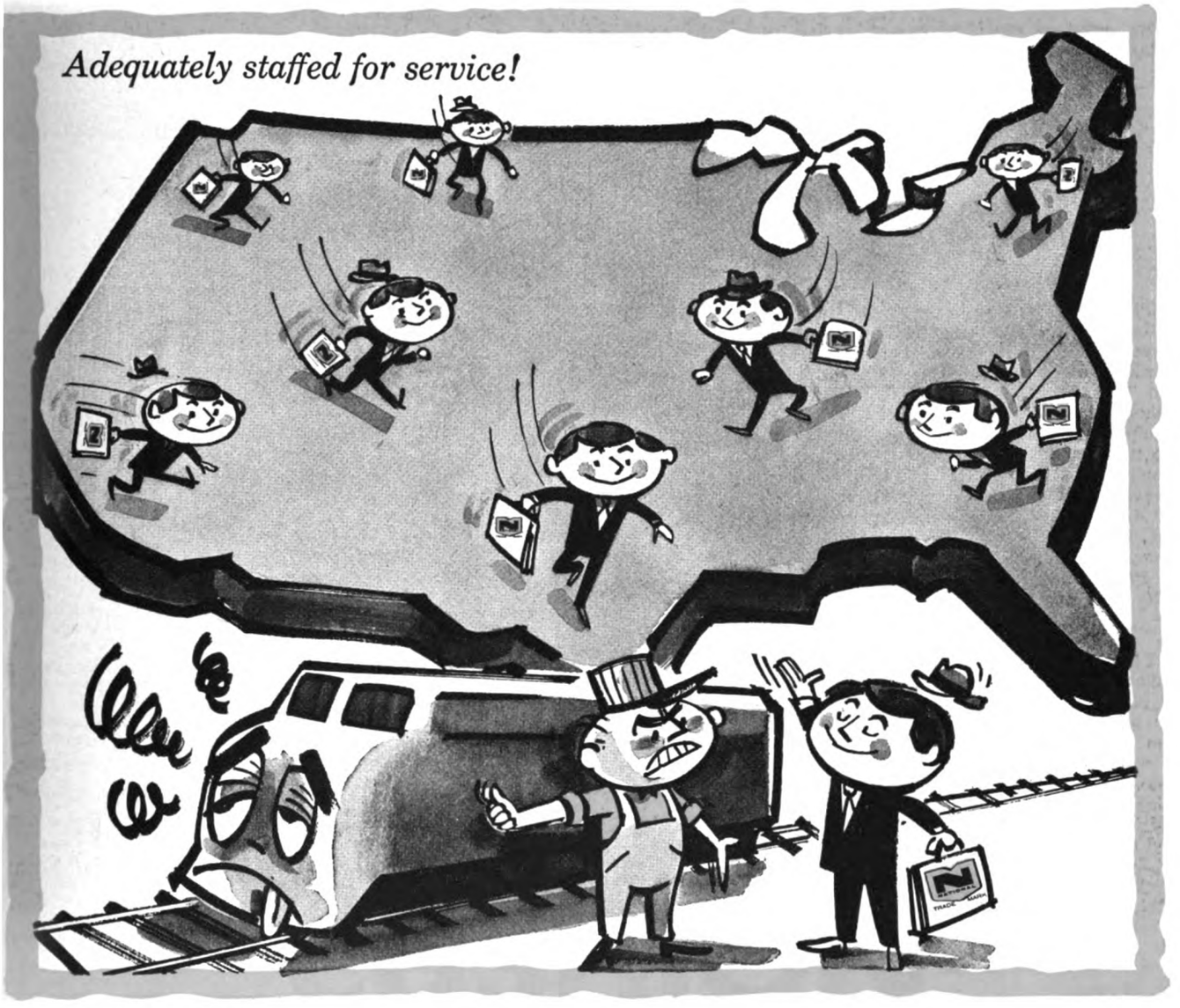
Hydraulic turbines • Weldments • Dump cars • Nonferrous castings • Special machinery • Bending rolls • Machine tools



NATIONAL TRADE-MARK has the team to assist you in proper brush selection

KEN MATZ

A railroad had both mechanical and electrical problems causing excessive maintenance on diesel traction motors, says "National" Carbon Technical Serviceman, Ken Matz.

The trouble was attributed to brushes. Ken assisted the railroad in analyzing the problems. After evaluating various brush grades, his recommendation for a change to a "National" brush grade was promptly adopted by the railroad.

Subsequent inspections by Ken, Floyd Anderson and John Gibb substantiated his recommendation. Once again, this demonstrates the thoroughness with which your "National" Carbon Brush Men handle railroad brush problems. There are twenty-six of these specialists throughout the country ready to serve you. For information call or write: National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, New York.

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REPORT FOR DECEMBER—*Continued from page 5*

ican Railroads, 3140 South Federal st., Chicago 16. Price: To members, 50 cents; to others $1.00.

AAR SPECIFICATIONS FOR TANK CARS.—Revised Specifications for Tank Cars—Issue No. 1, July 1958—supersedes previous edition of August 1956. AAR Committee on Tank Cars believes that all concerned should have full knowledge of the new requirements, particularly those pertaining to tank cars handling newly developed liquid products and chemicals. *F. H. Stremmel, secretary, Mechanical Division, Association of American Railroads, 59 East Van Buren st., Chicago 5. Price: To members and others, 100 copies or more, per 100, $110.00; 20 copies, $57.50; one copy $1.25. Covers 20 cents each.*

NEW WELDING SYMBOLS.—New Standard Welding Symbols incorporates additional symbols needed to describe new processes and new types of welds—symbols for spot and seam welds made by arc welding, for types of welds used in structural steel fabrication, etc. Table provides a new system for designating welding and cutting processes by means of letters, a system covering 37 commercially used welding processes. Chart of Welding Symbols redesigned to incorporate new developments and simplify recognition of symbols.

American Welding Society, Department T, 33 West 39th st., New York 18. Price of booklet, $3. Chart for wall use, $1.50; for desk use, 50 cents.

Orders and Inquiries for New Equipment

Placed Since the Closing of the November Issue

Diesel-Electric Locomotive Orders

Road and builder	*No. of units*	*Horsepower*	*Service*	*Other data*
CHICAGO, ROCK ISLAND & PACIFIC:				
Electro-Motive	8	1,750	Road switch.	GP-9's. Cost $[illegible] delivery second [illegible]
ILLINOIS CENTRAL:				
Electro-Motive	20	1,750	Road switch.	For delivery [illegible]
SOUTHERN PACIFIC:				
Alco Products	70	1,750	—	70 units in [illegible]
Electro-Motive		1,800	—	delivered by [illegible]

Freight Car Orders

Road and builder	*No. of cars*	*Type of car*	*Cap, tons*	
CHESAPEAKE & OHIO:				
ACF Industries	50	Flat	70	85-ft. Cost [illegible] unit. Delivery February.
CHICAGO, ROCK ISLAND & PACIFIC:				
Pullman-Standard	100	Box	50	50-ft. Total [illegible] For delivery in 1959.
DULUTH, SOUTH SHORE & ATLANTIC:				
Pullman-Standard	1	Box	[illegible]	PS-1. Cost $[illegible] livery this month
MINNEAPOLIS & ST. LOUIS:				
Pullman-Standard	20	Covered hopper	70	Delivered in [illegible]
NORFOLK & WESTERN:				
Pullman-Standard	25	Box	50	Delivered in [illegible]
SOUTHERN PACIFIC:				
General American	100	Flat	[illegible]	85-ft. Cleian [illegible] ruary delivery
UNION TANK CAR CO.:				
Company shops	42	Tank	[illegible]	Class 105. For [illegible] quarter 1959

Passenger Car Orders

Road and builder	*No. of cars*	*Type of car*	*Other data*
NEW YORK TRANSIT AUTHORITY:			
ACF Industries	110	Subway	Cars will have [illegible] ing systems and [illegible] floors. Authority [illegible] 20 sets of Adm[illegible] from ACF.

Notes and Inquiries

LOCOMOTIVES:
New York, Chicago & St. Louis arranging to place order for 35 diesel locomotives at an estimated [illegible] 000.

FREIGHT CARS:
Baltimore & Ohio converting 10 additional flat cars for use in piggyback service.

PASSENGER CARS:
Illinois Central has acquired eight lightweight sleeping cars from New York Central at a cost of [illegible] 000. Purchase includes four 10-roomette, 5-bedroom cars, and four 4-compartment, 4-bedroom, 2-dra[illegible]

PASSENGER TRAINS:
Chicago, Rock Island & Pacific has bought GM's two Aerotrains for Chicago-Joliet, Ill., suburban [illegible] will be called "Suburbanites."

Letters to the Editor

Combustion Characteristics Of Economy Fuels

TO THE EDITOR:

We were very pleased to note that the September 1958 issue of *Railway Locomotives and Cars* contains an abstract of our ASME Paper 58-OGP-14, "Performance of Economy Diesel Fuels in a Railroad Locomotive-Type Diesel Engine." We would like to make one comment regarding the information appearing in this article.

Table 2 of the paper appears in your abstract under the heading "Here Are the Results of the Test." Several people have questioned the power output data shown for 30 and 35 cetane fuels at the standard rack setting (24/64 in.). Apparently, an erroneous impression has been created by these data—that the 35 cetane fuel produced more power than the 30 cetane fuel.

We wish to point out that the data presented in Table 2 of the paper represents the results of test runs at one fuel rack setting and were included in the paper as an example of the test data obtained. Minor variations in test results at any one test condition (fuel rack setting) would be expected to occur in tests of this type. The performance of the fuels in terms of power output is expressed more accurately by the results of tests over a range of fuel rack settings which are illustrated by the curves of Fig. 3 of [illegible] These curves show that the 30 [illegible] which has a higher heat content per [illegible] than the 35 cetane fuel, produced more [illegible] than the 35 cetane fuel over a range [illegible] rack settings. This is indicated by [illegible] of the paper and by the summary [illegible] in Table 4 which was derived from [illegible] shown in Fig. 3 and 4.

TABLE 4—COMPARATIVE POWER OUTPUT OF ECONOMY FUELS AND REGULAR 2D TYPE FUEL AT STANDARD FUEL RACK SETTING (⅜ in.)

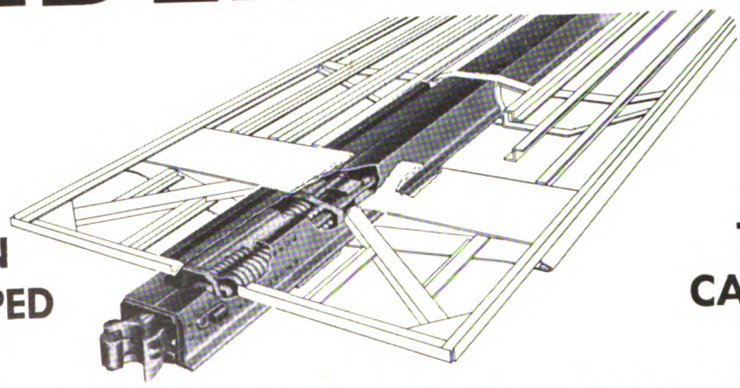
Fuel	Per cent increase over 2D fuel
35 cetane number	4.4
30 cetane number	5.4
Blend A	10.4
Blend B	8.4
Blend C	5.8
Heavy distillate fuel	9.7

We hope that this information will [illegible] any erroneous impressions created [illegible] the performance of these fuels, and [illegible] appreciate any efforts you may [illegible] clarify this point. Again, we would [illegible] express our appreciation to you for [illegible] ing an abstract of our paper in your

T. A. Kramer and
D. P. Osterhout, Jr.
Supervising technologists,
Research and Development Lab
Socony Mobile Oil Co.

C. B. & Q.

SAFEGUARDS LADING with WAUGH CUSHION UNDERFRAMES



200 70-TON CARS EQUIPPED

125 50-TON CARS EQUIPPED

WAUGH EQUIPMENT COMPANY

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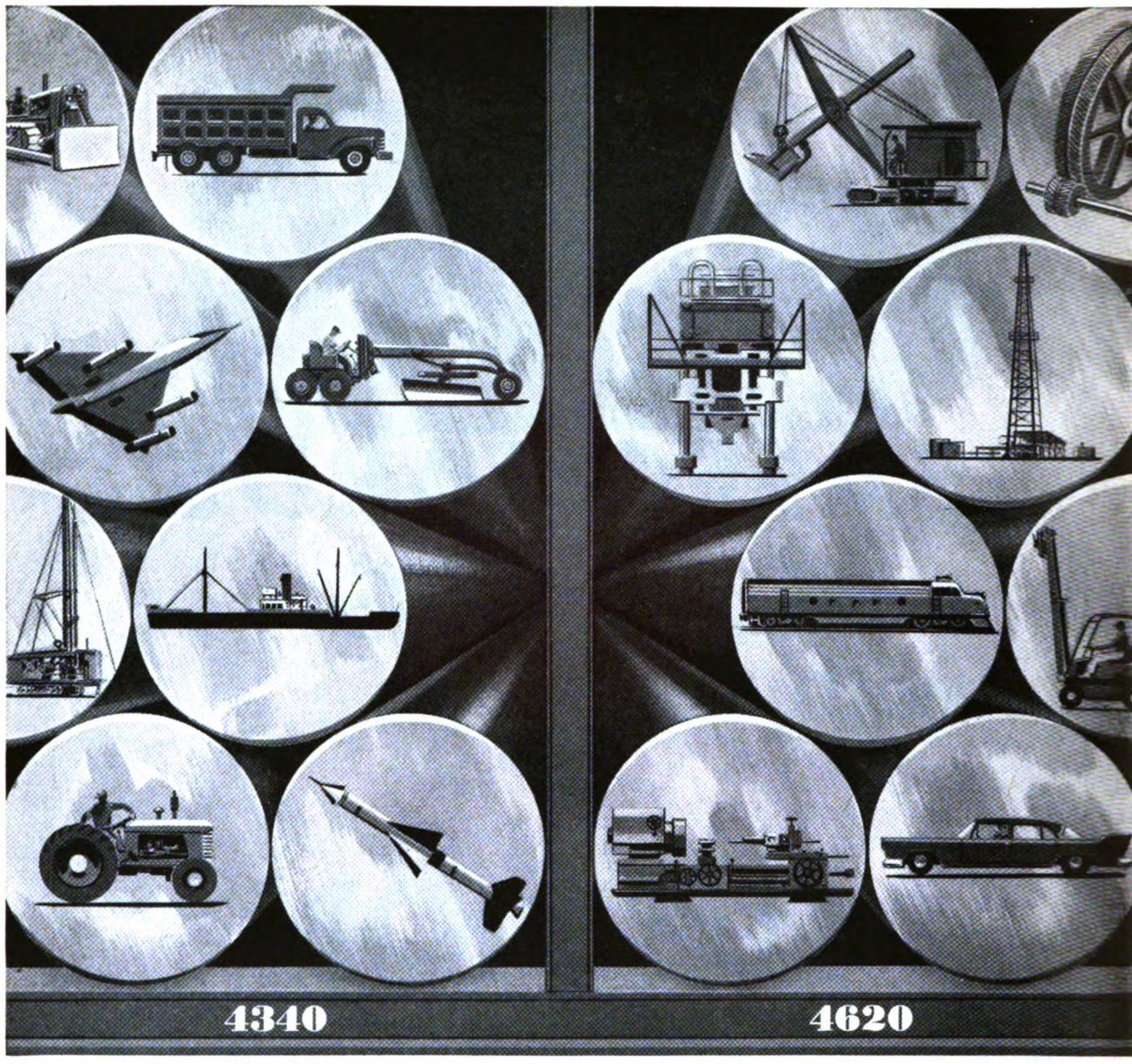
CHICAGO — Canadian Waugh Equipment Co., Ltd., Montreal, Que. — ST. LOUIS



No matter what you make...

look to these two general purpose steels to standardize, simplify, and save money!

4340 THROUGH-HARDENING

4340 stands alone among medium carbon steels in its ability to provide maximum strength, ductility, toughness and resistance to fatigue in parts of medium to heavy cross section.

4620 CARBURIZING

4620 is a carburizing type that has consistently proved itself the ideal steel for a wide variety of carburized parts. 4620 is easy to carburize and has a minimum tendency toward distortion in heat treatment.

AMERICAN STEEL WAREHOUSE ASS'N.

Easy to Get *. . . Both these steels are carried by many Steel Service Centers from coast to coast* . . . ready for delivery on a "next door" basis. For a list of names and addresses of Steel Service Centers that carry AISI 4340 and 4620, write us.

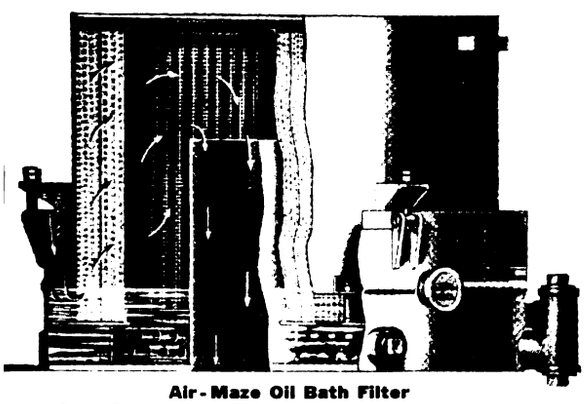
THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street New York 5, N.Y.

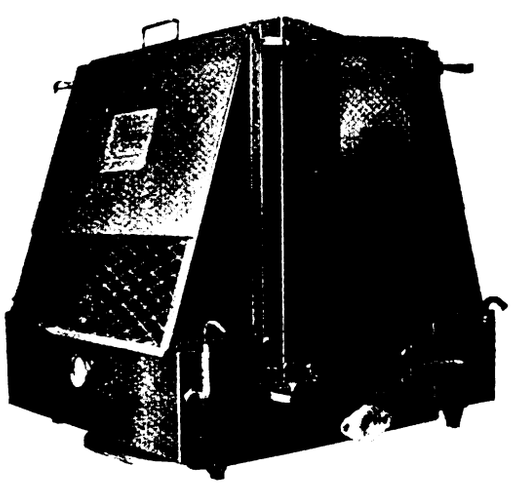
INCO TRADE MARK

longer life for your locomotive diesels

with cleaner intake air from AIR-MAZE oil bath or panelbath filters



Air-Maze Oil Bath Filter
for efficient filtration at low maintenance expense.



Air-Maze Panelbath Filter
for effective filtration at low initial cost.

Which should you use? *One or both of these Air-Maze filters has the economic answer to your locomotive requirements. Evaluate the advantage of each filter under your operating conditions.*

OIL BATH FILTER—Removes 92% or more of all objectionable dirt... has exceptionally high dirt-holding capacity... requires only semi-annual or annual oil changes and bowl deposit removal.

PANELBATH FILTER—Built to up-grade panel filtration of intake air, the PANELBATH has low initial cost... replaces 2" and 4" oil-wetted or centrifugal panels on engine air intakes. Requires only periodic servicing at 90-day intervals under normal operating conditions.

Replaces panel filtration with resultant efficiency at least equal to that replaced.

The principle of the oil bath used in both these Air-Maze filters is backed by successful service on over 4000 locomotives.

For further information, contact your locomotive builder or write Air-Maze Corporation, Cleveland 28, Ohio.

PRI MEMBER

The biggest names in diesels are protected by Air-Maze filters

AIR-MAZE
The Filter Engineers

ENGINE AIR FILTERS • CAR BODY FILTERS • LUBE OIL FILTERS • OIL SEPARATORS • PASSENGER CAR FILTERS

Welding and Chipping Goggle

A new goggle for welding and chipping has a frame of soft but durable and flame-resistant vinyl plastic. The material is very light in weight and conforms easily to the contours of the operator's face. The eye piece adapted is molded of more rigid plastic material, permitting both eye pieces to be raised as a unit without disturbing prescription glasses. A cover lens protects the 50-mm green filter lenses which can be had in shades 3 to 6 for welding use. Substituting the cover and filter lenses with hardened lenses adapts the goggles for chipping and grinding protection. *Air Reduction Sales Company, a division of Air Reduction Company, Dept. RLC, 150 East 42nd st., New York 17.*

Dry Chemical Fire Extinguishers

The new Ansul "D" model chemical fire extinguishers feature "fresh-fill" performance, including maximum fluidization, absolute gas tightness, and simpler operation. Four models comprise the line: 5-, 10-, 20-, and 30-lb capacities. They can be had in fire equipment red or in white for maximum visibility in any location. The U.L. ratings are 8, 16, 20 and 30 B:C, respectively. *Ansul Chemical Company, Dept. RLC, Marinette, Wis.*

Electrical Insulating Tape

Type PDG tape is a combination of polyester warp and fiber-glass yarn to which a silicone coating is calendered to one or both sides. Elongation is 15 per cent; there is no abrasion between warp and filler threads, and comformability is said to be excellent. The relatively high tensile and elongation permits the tape to be snugly applied even on irregular contours. The absence of destructive friction between the polyester and the glass fibers under flexing and vibration prevents failure of the glass yarn.

The tape is supplied in .010 in. and over thickness. *Quaker Rubber Division, H. K. Porter Company, Dept. RLC, Tacony and Comly sts., Philadelphia 24.*

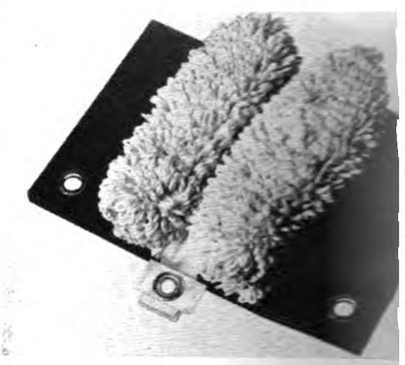
Self-Propelled Scaffolding

A self-propelled scaffolding on wheels, which can be moved while elevated, is said to save 25 per cent of a workman's time. It is propelled by a crank at the side of the guard rail. A steering handle permits forward or reverse movement, and a safety brake locks the unit in position while working. The scaffolding is of welded and bolted steel construction, and its wooden platform can be adjusted to one of seven positions up to 12 ft. high. It can be assembled or disassembled in less than 60 sec. *Castle Manufacturing, Inc., Dept. RLC, 1701 Glenwood, Flint, Mich.*

Journal Lubricator

The Premier journal lubricator has a wool felt base, twin foam-neoprene center cores, and cotton duck covering with chenille wicking loops, and is said to provide low journal operating tempertaure with low sensitivity to dirt.

The wool felt base serves as an oil reservoir, prevents damage to the lubricating pad,



and eliminates danger of "wick grabs" bearing.

A twin foam-neoprene design was s so that positive journal contact co achieved without excess pressures which elevated operating temperatures. Best w action, too, is said to be obtained in th ter section between the neoprene cores.

Two strands of tufts clear the journ each side. As a car starts to move, tufts one side are drawn under the journal, n diately depositing a quantity of oil. *Pre Manufacturing Corporation, Dept 107 Penn ave., Pittsburgh 21.*

High-Pressure Steam Cleaner

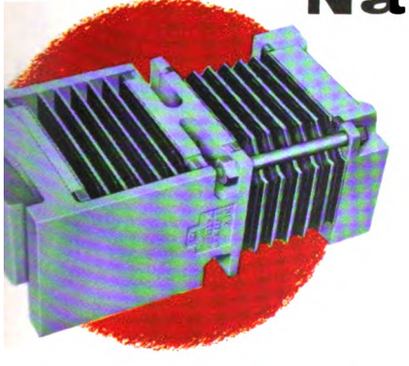
A fully automatic, heavy duty steam clea for one-man operation in automotive craft, railroad, and general industrial m tenance operations, has a cabinet of hea gage metal protected both inside and with a baked enamel finish. There are dangling wires or outside openings. A is provided for the gun and hose.

The cleaner is available in two capacit Model 275-110 volts, 1½ hp; Model 3 220 volts, 3 hp. Both units have a fuel ca pacity of 15 gal and a soap capacity of gal of concentrated solution. The soap re lator is clog-proof and easily regulate *Circo Equipment Company, Dept RLC Terminal ave., Clark, N.J.*

(Turn to page 14)

JIPMENT MODERNIZATION Key to Successful Railroading

National Rubber Draft Gears
on the Southern Railway



s the 65,500 foot-pound cushioning
pacity of National MF-400 Rubber Draft
ar that reduces center sill stress as much
59%, thus giving greater protection to
car structure from damaging impacts.

National Rubber Draft Gears are used to provide a high degree of impact protection for freight cars on the Southern Railway System. In addition, the Southern's large Diesel road locomotives also use National Rubber Draft Gears to protect car and locomotive structures.

In fact, today there are more than 30,000 carsets of National Rubber Draft Gears in service on America's railroads — many with service records of over 8 years and hundreds of thousands of maintenance-free miles.

AA-7368

NATIONAL MALLEABLE and STEEL **CASTINGS COMPANY**

Established 1868

Railway Division Headquarters
Cleveland 6, Ohio

International Division Headquarters
Cleveland 6, Ohio

CANADIAN SUBSIDIARY: *National Malleable & Steel Castings Compan*
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LERS · YOKES · DRAFT GEARS · FREIGHT TRUCKS · JOURNAL BOXES

LEADER IN PROGRESS RPI MEMBER

WHAT'S NEW IN EQUIPMENT—*Continued from page 12*

Tool Set

This 5232-GS-BB general purpose set of 232 tools is complete with chest, drawer section and Roll-Cab. It is for use in servicing and repairing machines, gas or diesel engines, cars and trucks, and material-handling equipment. The tool chest and drawer section are standard. However, another drawer arrangement can be selected if desired. A raised rim around the Roll-Cab top and corner retainers on the drawer section hold the three units in place. The set contains socket combination, ignition, tappet and hex-head wrenches; pliers; standard and Phillips screwdrivers; chisels and punches; "Torquometer"; soldering gun; hack saws; snips; wire brush; tape; hammers, and many specialized automotive tools. *Snap-On Tools Corporation, Dept. RLC, 8928 28th ave., Kenosha, Wis.*

Spring Pin Kit

The No. 300 Kit is a compartmented plastic box containing 700 carbon-steel Rollpins of various diameters, including 1/16, 5/64, 3/32, 1/8, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8 and 1/2 in. The individual pieces range in length from 3/16 to 3 1/4 in. and include a "mix" believed to be most practical for machine shops, repair work, etc.

The Rollpin is a slotted, chamfered, tubular spring pin which can serve as a taper pin, straight pin, set screw, rivet, dowel, hinge pin, cotter pin, or stop pin. *Elastic Stop Nut Corporation of America, Dept. RLC, 2330 Vauxhall Road, Union, N. J.*

Lubricator Pad—A Correction

In the description of the new Magnus lubricator pad on page 12 on the November issue it was incorrectly stated that "Each pad is 6 in. by 11 in. and holds up to 5.9 pt of oil."

The pads are available in standard sizes for 5 x 9, 5½ x 10, and 6 x 11 car journals, and each pad will hold more than 2.5 times its own weight in oil—better than 5.9 pts for the 6 x 11 size.

Air-Cooled Engine-Driven Welders

Three drooping voltage arc welders provide 115/230-volt, 10-kw, single-phase, 60-cycle power when operated as power plants. They have 115-volt, 1-kw d-c auxiliary power available for operating lights and power tools while welding. The 250-amp d-c machine is for general purpose construction and maintenance welding in the field. The 300-amp a-c/d-c machine is a remote area welder and power plant for a-c welding and d-c reverse or d-c straight polarity welding current. The 300-amp a-c/d-c Heliwelder is for field operations where aluminum or magnesium structural welding is involved. Automatic inert gas control panel with solenoid valve and post flow timer is standard equipment on the Heliwelder.

The machines are equipped with Hercules-Lycoming engines. Optional accessories include two-wheel road trailers, canvas c... and a water-circulating system. *Air ... tion Sales Company, Dept. RLC, 15 ... 42nd st., New York 17.*

Hydraulic Jacks

Two high-lift hydraulic jacks added to Simplex line have a capacity rating o... tons and are equipped both with hig... low-speed pumps which may be ope... singly or in unison. Model 25H28 ha... closed height of 28 in., a 22-in lift ... weighs 125 lb. Model 25H22 has a ... height of 22 in., a 16-in. lift and we... 105 lb.

Both models are designed to lift 5... cent over their 25-ton rated capacity T... may be operated either in vertical or ... zontal position and are equipped with det... lever sockets to permit operation in ... quarters. *Templeton, Kenly & Co. ... RLC, Broadview, Ill.*

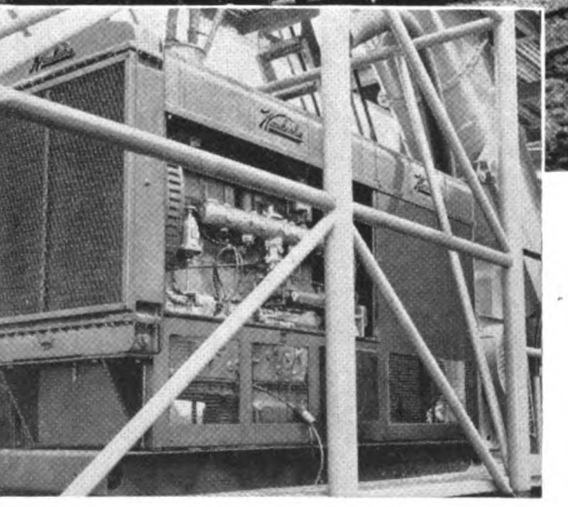
Mercury Lamp

A new 400-watt "Bonus Line" mercury ... for street lighting and general ind... said to have a better maintained light ... than any other discharge lamp, including ... fluorescent. It will give 25 per cent ... light than present 400-watt mercury ... after one year, or about 4,000 hr of ... time; at the end of 8,000 hr, 65 per ... more light. It is completely interchange... with the present 400-watt mercury and ... a useful life in excess of 9,000 hr ... more than the 400-watt mercury. *Large ... Dept., General Electric Company, ... RLC, Cleveland 12.*

(*Turn to page 60*)

WAUKESHA

ENGINATOR® powers Car Icing Machine Unit



Moving on a track alongside refrigerated car trains . . . no icing platform needed . . . this mobile icing machine unit ices cars on either side. So flexible is its extending or retracting snout, that four hatches of adjacent ends of two cars can be iced from one position. With four men, a train is iced at two minutes per car.

This Waukesha-Enginator-powered mobile unit is speeding the icing of the Pacific Fruit Express Co. cars at Eugene, Oregon. Its head-end 4-wheel tractor carries the power plant and icing machinery; and the four 4-wheel trailers haul a total of 60 tons of ice in 300 lb. blocks.

On the tractor is a Waukesha 100 KW Enginator (a gasoline engine operating at 1800 rpm direct-connected to a 240/480 AC 3-phase 60-cycle generator). It powers controls (in cab on snout), ice breaker and elevator delivering ice to snout, also chain elevator (through trailers) which feeds ice to breaker. Breaker makes coarse or fine ice, which is salted at the top platform. Waukesha Enginators for gas, gasoline or Diesel fuels are available in 50 to 800 KW capacities. Send for descriptive bulletins.

392

RAILWAY DIVISION WAUKESHA MOTOR COMPANY · WAUKESHA, WISCONSIN

Along with the Railroads... Picking up

Railroad progress is also spelled out
in terms of higher speeds . . . heavier cars . . .
carrying more lading more efficiently.

Griffin answered the *requirements*
for that progress with the EQS Steel Wheel.
And, the record of acceptance—
well over a half-million wheels shipped—
shows it was the *right* answer!

GRIFFIN EQS®
ELECTRIC QUALITY STEEL

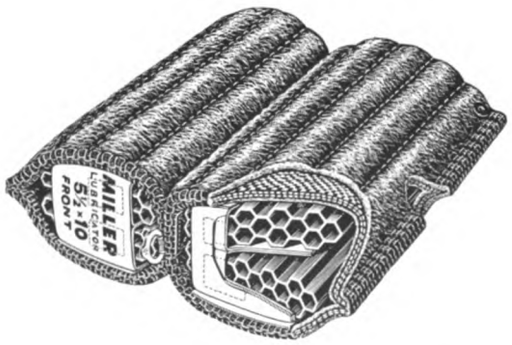
GRIFFIN WHEEL COMPANY, 445 N. Sacramento Blvd., Chicago 12, Illinois
In Canada: Griffin Steel Foundries, Ltd., St. Hyacinthe, Quebec

Give the "green" to GRIFFIN
and watch your costs go down!
1957
199,000
WHEELS
SHIPPED
(Accepted as
AAR Standard)
1958
245,000
WHEELS
SHIPPED
Speed!
Congratulations to the
Burlington
Route
A friend and customer for
more than 70 years
MEMBER

235,000 CARSETS TO DATE

FOR PROGRESSIVE RAILROADING

Our sincerest thanks and appreciation to the Burlington Management for its ever increasing use of Miller center-feed lubricating pads



$38 PER CARSET IN U.S.A.

10,000 CARSETS ALWAYS ON HAND—LIFE EXPECTANCY—6 YEARS

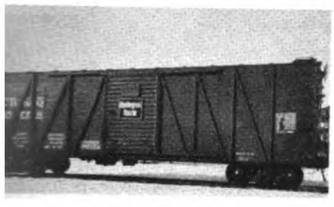
FIELD SERVICE IS AVAILABLE

MILLER LUBRICATOR CO., WINONA, MINN.

In Canada: Napanee Iron Works, Napanee, Ont. and Montreal, Que.

Burlington Route **Special Report**

1934



1935

1936

1936

1937

1942

In 1959 . . .

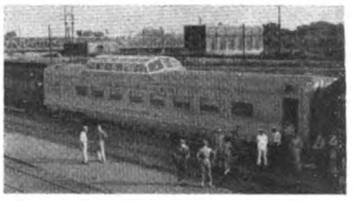
No 'Let Up' in CB&Q Equipment Maintenance

THE BURLINGTON . . . 8756 miles of railroad in the Mississippi and Missouri valleys between Chicago and the Rockies . . . a pioneer in streamlining and dieselization . . . a champion of passenger service . . . a pacesetter in freight car construction and maintenance. Here you have the story of the Burlington's mechanical department an organization which can face 1959 and its problems with the same ingenuity which has solved a whole series of revolutionary equipment and equipment maintenance problems during the past quarter century.

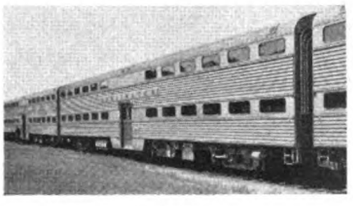
It was 1934 when the Burlington operated the first original stainless-steel Zephyr streamliner. A multitude of problems have been solved since those depression days: Equipment and equipment servicing for a revitalized passenger service; operation and maintenance of diesel road locomotives for passenger and then freight service; cars and power for huge wartime freight and passenger loads; systematic additions to the freight car fleet; the first dome cars; the first gallery coaches; and the first Slumbercoaches. Finally, the mechanical department has maintained effective control of costs during an inflationary period.

Today 4060 employees maintain and service 786 locomotive units 46,863 freight cars, 1064 passenger cars and 4807 non-revenue cars which comprise the rolling stock of one of the Midwest's most progressive railroads. Control of costs refinement of methods, and reliability of equipment operation are primary problems which confront the Burlington mechanical department in 1959.

HIGHLIGHTS OF A QUARTER CENTURY: *1934—First diesel-powered, stainless-steel, articulated, Zephyr streamliner goes into service; 1935—Freight car building programs are resumed; 1936—Burlington's first non-articulated, road-passenger diesel locomotive goes into service; 1936—First diesel shop is built at Chicago (view shows it still in use today); 1937—First diesel switching locomotives are acquired; 1942—First FT road locomotives begin handling freight trains; 1945—First dome cars are built; 1950—Suburban service is modernized with first high-capacity operation; 1956—First Slumbercoaches are placed in service; 1956—Gallery cars; 1953—Piggy-back service, begun in 1941, becomes maior Latest vista-dome Zephyr goes into operation; 1958—Freight car building program continues at fast pace.*



1945



1950

1953

1956

1956

1958

Goal of the Burlington's Mechanical Department . . .

'Doing Job Better Than It Has Been Done'

"IN PERFORMING its taks of keeping the Burlington's rolling stock in good running condition, our mechanical department is guided by several basic ideas that underlie its activities," J. D. Rezner, mechanical assistant to the vice-president, explained. During this interview, the Burlington's chief mechanical officer went on to comment on his department's activities—present and future.

'Centralization . . .'

"One point that deserves emphasis is centralization. We have centralized our locomotive repair and maintenance at West Burlington, Iowa; our freight car building repair and maintenance at Havelock, Neb., and our passenger car repair and maintenance at Aurora, Ill. Centralization of our heavy repair work at these points has enabled us to use production-line techniques which we have found to be effective in avoiding high maintenance-cost-per-mile ratios.

'Flexibility . . .'

"At the same time we have introduced flexibility into our operations by locating facilities for light repairs at various points strategically situated around our system—Hannibal, St. Joseph, and Kansas City, Mo.; Denver, Colo. (the western end of our system); Chicago (our eastern terminus); Galesburg, Ill. (the hub of our lines East); Lincoln (the hub of Lines West); Omaha, Neb. and St. Paul, Minn. for example.

'Stability . . .'

"Stability is another feature of our car building, maintenance and repair programs. By scheduling our activities at a relatively steady pace we avoid a "snowballing" of work that might overtax our manpower or facilities. A stabilized maintenance program helps us retain a constantly available skilled work force which is conducive to efficient and economical production.

"For more than 20 years we have been building a substantial part of our new freight cars of standard types. We have found that our Havelock Shops have been able to build new cars on a production line basis at less than the cost for which they could have been purchased from commercial car builders.

'Communication . . .'

"With our many widely separated facilities communications takes on special importance. We try to achieve a free flow of information between our Chicago headquarters and shops along the line, thereby keeping us advised about the condition of our locomotives and cars. Recommendations of local supervisory staffs concerning maintenance problems are studied carefully. Standardization of maintenance and repair practices is achieved by p[osting] of all personnel on the [available] techniques.

'Improvements . . .'

"In our cyclical heavy repair freight cars we make improvements them incorporating modern feature the rebuilt cars. In the testing of chased materials and equipment ing metallurgical and chemical ana our research laboratory at Aurora an important role.

'Look Forward . . .'

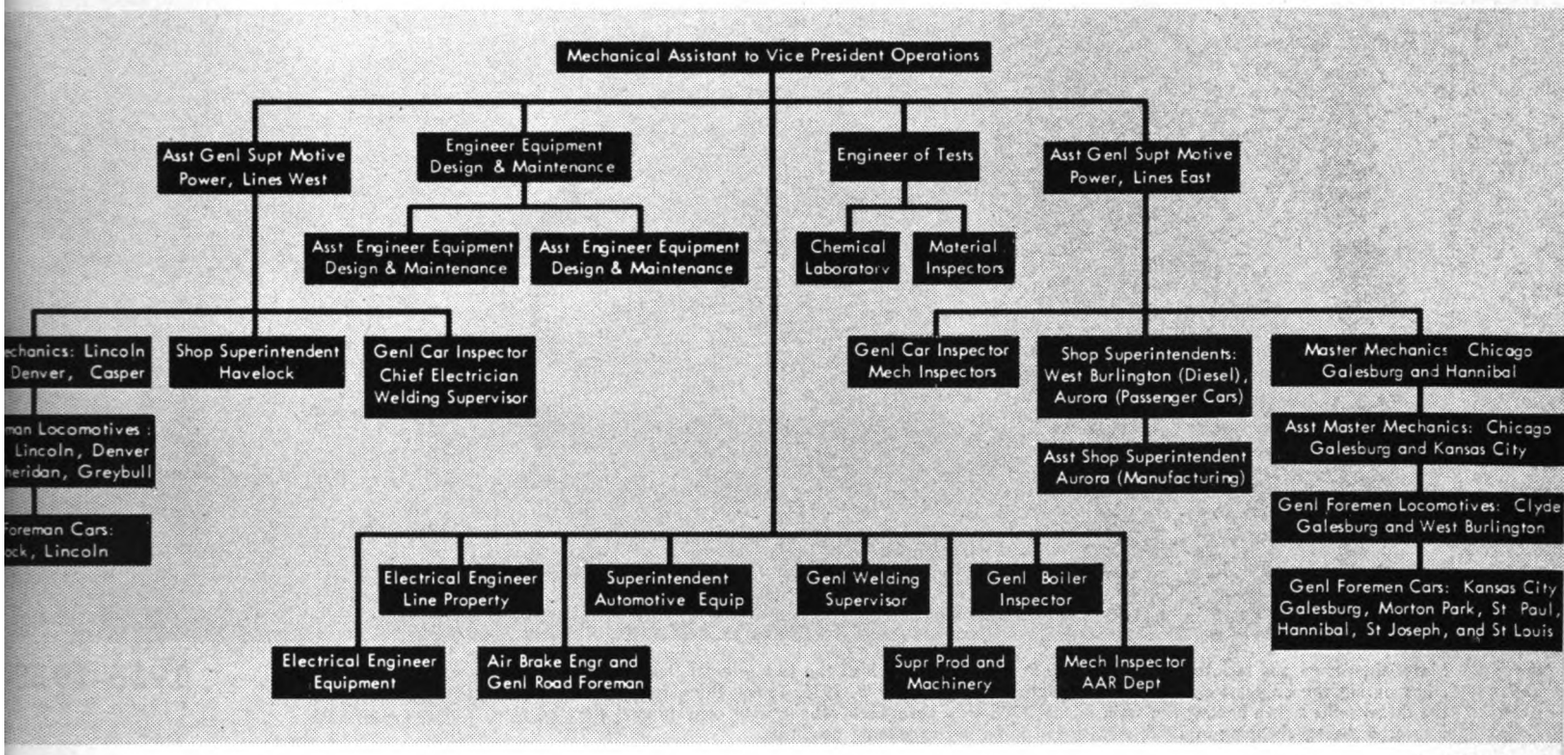
"We look forward to the day all rolling stock will be equipped roller bearings. The most bother problem facing railroads today hotbox. Aside from bearing per ance there is still room for imp ment in other component parts of ing stock. For instance we need ter shock-absorbing draft gears dier bolsters and lighter and stron metals for sheathing, ends and frames.

"We believe that the best g doing the job better than it has done in the past. Numerous stud have been made in the past and continue to be made with a view ward improving our facilities. H ever, no expenditure is requested management unless we are satis that substantial savings can be

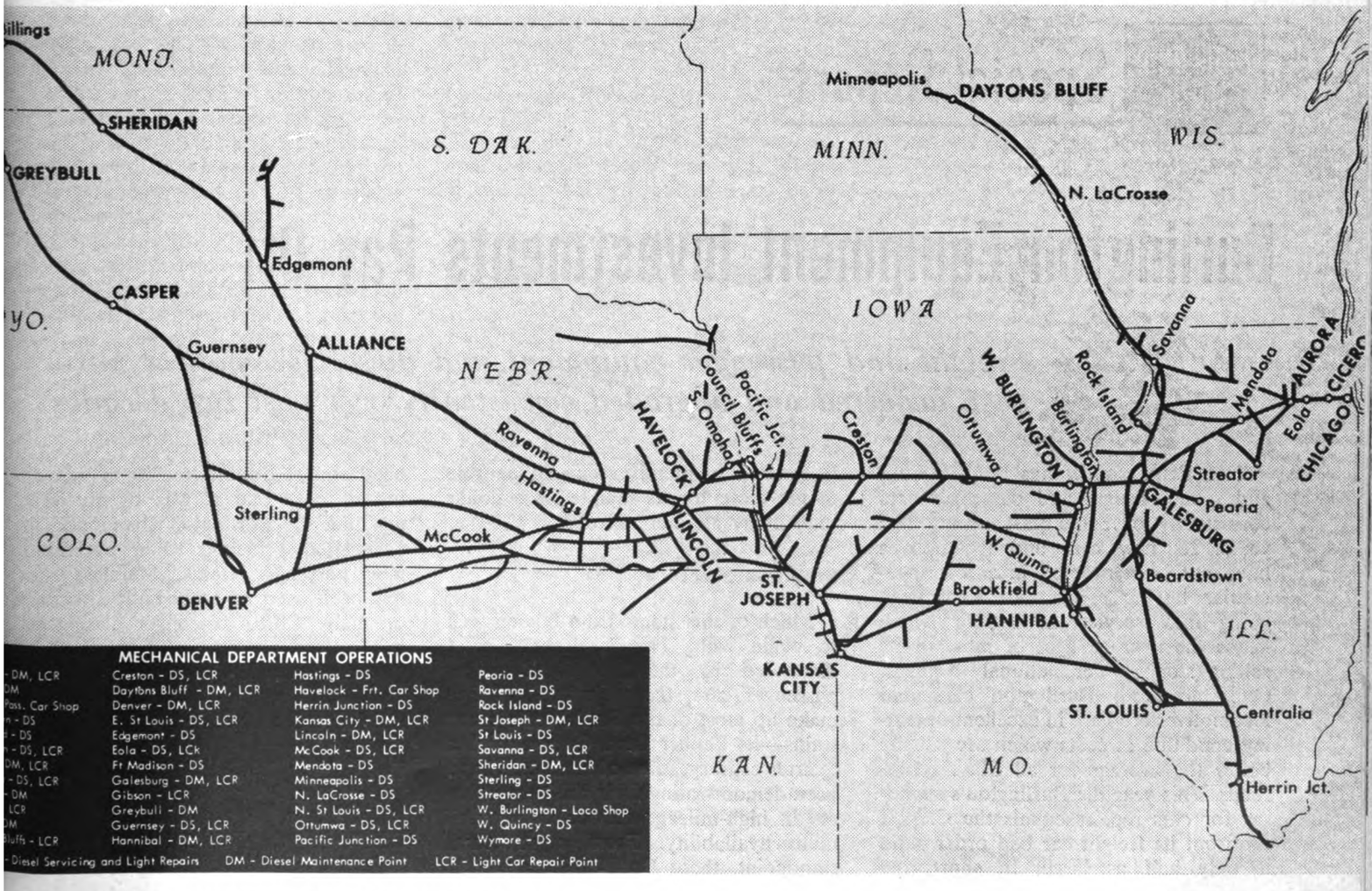
Burlington Has Controlled Its M of E Expenses

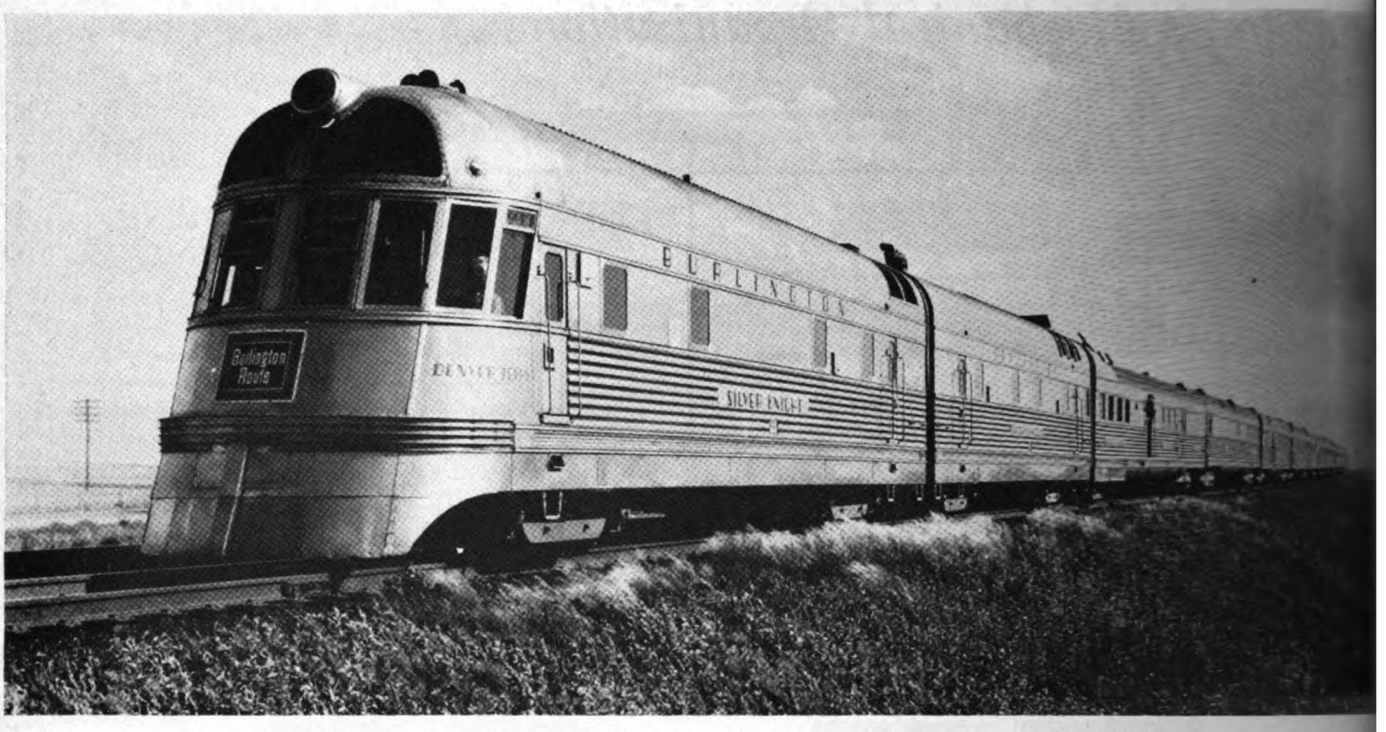
YEAR	MAINTENANCE of EQUIPMENT EXPENSES	RATIO OF MAINTENANCE EXPENDITURES TO OPERATING REVENUES					
		Locomotive Repairs		Car Repairs		All M/E Expenditures	
		Burlington	Class 1 RR's	Burlington	Class 1 RR's	Burlington	Class 1 RR's
1957	$44,775,473	3.9	5.9	7.2	7.2	17.3	18.2
1956	42,790,642	3.7	4.6	7.1	7.2	16.6	17.9
1955	39,149,896	3.6	4.8	6.4	7.2	15.7	17.7
1954	43,180,519	3.8	5.1	7.4	7.2	17.1	18.5
1953	40,018,049	3.5	5.3	6.0	7.9	14.2	18.[illegible]
1952	40,839,794	3.5	5.7	6.7	7.5	15.1	[illegible]
1951	39,300,552	3.6	6.1	6.1	7.7	14.7	[illegible]

Burlington's Mechanical Organization . . .



. . . and Its Widely Dispersed Operations





Materials, design and maintenance have made it possible for each of the two original Denver Zephyr trains to operate 7,445,317 miles during the 22 years since their introduction on November 8, 1936. Today, these two trains operate as Texas Zyphers, and the diesel units shown hauling the train in this 1936 view have been rebuilt with conventional elevated cabs. Stainless-steel cars, inspected during shopping in 1956, were found to be in "excellent" condition.

1936-19

Burlington Route **Special Report**

Burlington Equipment Investments Pay Off

Freight and passenger equipment and diesel locomotives have been acquired and upgraded consistently over past two decades

THE BURLINGTON has bought, built and rebuilt freight and passenger cars consistently over the past twenty five years. Its new cars and locomotives have not been ordered in a few spectacular buying sprees but have been going into service at a rate which keeps the average ages of most of its rolling stock under national averages. Once acquired, Burlington cars and locomotives are kept in excellent operating condition at costs which are usually below the average for all Class I railroads. This year the Burlington's spending for cars repairs equals the Class I ratio but its freight car bad order ratio is only half as large. In short, the Burlington frequently seems to be able to get more for its maintenance dollar than many another railroad.

Stainless Steel

Much of this stems from buying well to begin with. This is probably best illustrated by the 226 stainless-steel passenger cars, the majority of which make up most of the Burlington's crack trains—its Zepher fleet. Over almost a quarter century, some of these cars have been demonstrating their ability to operate in high-mileage service with maximum availability. From a structural standpoint, these Budd-built cars have been almost trouble-free. It is interesting to note that it was twenty years ago that the Burlington abandoned the articulated principle when purchasing new passenger trains. Stainless steel has been used as a car-body sheathing on many CB&Q passenger diesels and has proved as successful there as in the coaches. The Burlington usually specifies a copper-bearing steel for its freight car construction.

Equipment Designs

From the beginning of the "streamliner" era, the Burlington has been a real pioneer in developing or utilizing

56-1958 Twenty per cent increase in revenue passengers has been recorded by two new Denver Zephyrs introduced October 28, 1956. Already these stainless-steel, vista-dome trains have operated 1,500,000 miles. H. C. Murphy, Burlington president, commented that "the impressive record of these trains offers additional evidence that fast, modern equipment and good service can attract an increased volume of passenger traffic to the railroads."

rolling stock designs. After its ex-ence with the earliest all-coach ıyrs, the Burlington was then a er in the evolution which brought ıt the luxury streamliner catering to classes of rail travel. As soon as ld War II ended and with the en-agement of General Motors the ington converted two of its light-ht coaches to produce the world's dome cars. In 1956, the Burlington into service the first Budd Slumber-hes—a sleeping car of such high ıcity that its room-type accommoda-s can be offered at basic coach fares. se cars have been operating at more 80 per cent of capacity since their oduction and have not diverted ic from higher rated Pullmans, but generated new travel.

he introduction of the stainless-l gallery coach in Burlington sub-ın service in 1950 was the major or in the complete renovation of operation. Today, 60 of these cars e established a pattern of comfort high capacity in car design. All of other 79 coaches used in the CB&Q ırban service have been completely ıilt and air conditioned. Power cars used to supply 64-bolt power for lighting and air conditioning for all ırban trains. This makes it possible ıse road passenger locomotives in suburban pool and means that it is necessary to have any specific loco-motives assigned to the operation of a maximum of 66 commuter trains in the Chicago area on week days.

Locomotive Policies

While the Burlington operated the first General Motors two-cycle diesel in railroad service, and was an early buyer of diesel switching and road passenger and freight locomotives, it is not completely dieselized even today. Steam locomotives have been relied upon to handle traffic peaks. This has meant that, until now, most diesels could be utilized to a maximum. During the past few months, several steam locomotives have been in service. Facilities for these steam locomotives have been retained at a number of points.

Even the construction of servicing and maintenance facilities for diesel locomotives have been handled most conservatively. At only a few points (Clyde, Lincoln, Galesburg and Denver) have complete new shops been built. Most of these have not been overly elaborate for the volume of work that is handled. At most other points, diesel locomotives are handled in portions of the original steam locomotive enginehouses which have been retained, or are serviced and lay over at outside facilities.

In the operation of these diesel locomotives, the Burlington has participated in few experiments. Its engines are all fueled with No. 2 Grade fuel oil. A straight mineral-base lubricating oil is used in all freight and passenger engines. This oil is changed at 48,000-mile intervals on the units in passenger service and at 40,000-mile intervals for units in freight service. There are no blotter tests or spectrographic examina-

LOCOMOTIVE FLEET

(October 1, 1958)

	Units owned	Average age (Years)
DIESEL ELECTRIC*		
Freight, A units	110	11.35
Freight, B units	87	11.57
Passenger, A units	103	8.77
Passenger, B units	1	18.00
Multiple purpose	205	4.25
Switching	177	12.75
Total diesel electric	683	9.25
Gas electric switching	1	26.00
STEAM		
Freight	62	34.56
Passenger	10	30.80
Freight or passenger	33	21.55
Total steam	106	30.10
Grand total	790	12.07

*All diesel locomotives are General Motors-built except for 30 1,000-hp Baldwin switchers, nine 1,000-hp Alco switchers, two 450-hp Midwest switchers, and five 360-hp General Electric switchers.

tions. Oil removed from crankcases is reclaimed by a Refinol plant at Clyde, Ill. and the volume is about 20,000 gal. per month. The reclaimed oil is then checked by the engineer of tests and it is reused on locomotives in any type of service.

Burlington diesels use chromate-treated cooling water. The water for steam generators is supplied from demineralizing installations at all of the terminals where passenger locomotives are serviced.

Freight Equipment

The Burlington has adopted new types of freight equipment with the same alacrity that it accepted or sponsored new passenger car designs. It was one of the early roads to conduct tests with light weight freight car construction materials such as aluminum and alloy steels. In 1941, the road converted its first flat cars for piggy-back service and has continuously operated equipment of this type for its subsidiary, Burlington Truck Lines, since that [illegible]. Since 1953, piggybacking has [illegible] a large-scale operation.

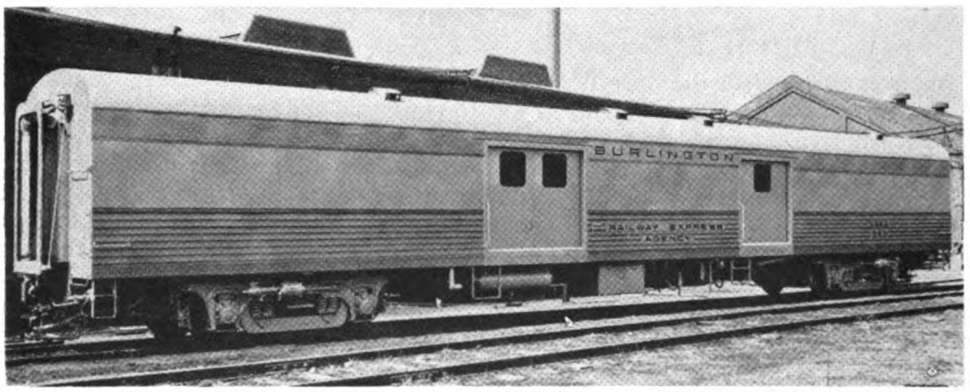
Another subsidiary, Burlington [illegible] frigerator Express, has 113 mech[illegible] refrigerator cars in operation. The [illegible] age age of the 2,303 refrigerator [illegible] of the BRE fleet is under eleven [illegible]. Other new freight car designs [illegible] the Burlington has adopted soon [illegible] their development include bulkhead [illegible] cars, Compartmentizer and DF [illegible] cars, General American Airslide [illegible] ered hoppers, and Pullman Stan[illegible] "super jumbo" covered hoppers [illegible] way Locomotives and Cars. Oct[illegible] 1958, p 24).

Cushion Underframes

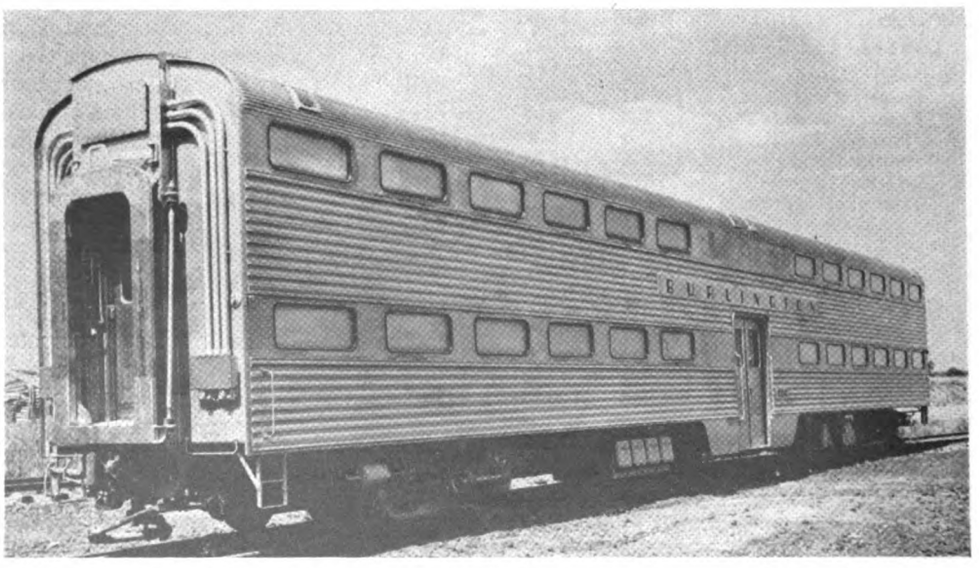
The Burlington now operates [illegible] box cars with cushion underframes. [illegible] of these cars and many other box [illegible] have been fitted with Compartmen[illegible] and DF equipment. Ride Control [illegible] have been used on all new cars [illegible] since before World War II. All new [illegible] are equipped with either one-piece [illegible] cast steel wheels.

Generally the Burlington mechan[illegible] department has not had to cope [illegible] wide fluctuations in maintenance [illegible] equipment appropriations, or [illegible] changes in overall policy. At the [illegible] time, the type of equipment acqu[illegible] and the way it has been maintain[illegible] from year to year have not made [illegible] necessary to resort to crash progra[illegible] for buying or repairs.

Insulated box cars built at Havelock this year are DF equipped. Refrigerator cars operated by subsidiary Burlington Refrigerator Express have usually been built in the BRE shops.



Fleet of welded baggage cars built at Havelock in 1954 have been painted and striped so their appearance will be compatable with the Zephyr trains in which they are operated.



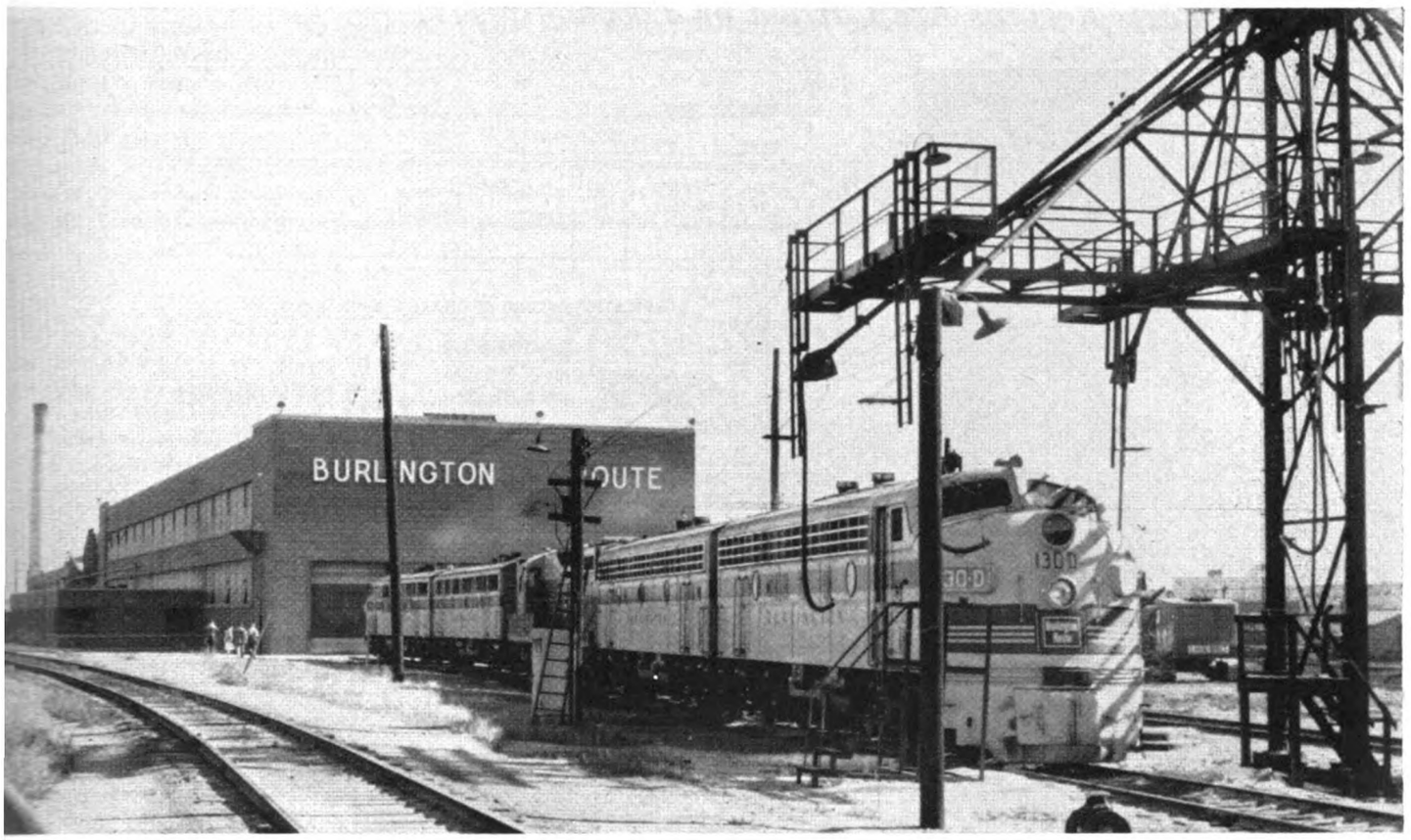
Gallery cars were first built in 1950 by Budd for Burlington suburban operation. This type of car has since been adopted by the Chicago & North Western and Southern Pacific.

REVENUE CAR FLEET

(January 1, 1958)

Type of car	Burlington ownership	Average age—Burlington	Average age—[illegible]
INTERCHANGE FREIGHT CARS			
Box	24,019	15.47	[illegible]
Flat	2,384	14.13	[illegible]
Stock	3,434	27.91	[illegible]
Gondola	4,937	17.96	[illegible]
Hopper	7,905	15.94	[illegible]
Covered hopper	1,901	5.63	[illegible]
Refrigerator	2,303	10.30	[illegible]
All interchange freight cars	46,863	16.38	[illegible]
PASSENGER EQUIPMENT			
Coach	292	23.30	[illegible]
Coach combination	53	32.06	[illegible]
Baggage, express	466	18.04	[illegible]
Sleeping	94	16.03	[illegible]
Parlor, Lounge	14	9.43	[illegible]
Dining	43	21.42	[illegible]
Postal	75	35.39	[illegible]
Other	25	41.56	[illegible]
All passenger equipment	1,062	21.78	[illegible]

Source — American Railway Car Institute



Five-unit diesel pulls out of Clyde shop on its way to pick up CD—Chicago to Denver fast freight. This is one of the most extensive Burlington shop installations. At most points, diesel shop and servicing facilities are much less elaborate than at this terminal just out of Chicago.

or Successful Locomotive Operation . . .

cheduled Maintenance and Controls Assure Reliability

Burlington diesels carry their own records with them and this eliminates need for a central record office.

SUCCESSFUL CONTROL of diesel repair sts, demonstrated by the 3.9 per cent operating revenues expended on lomotive repairs in 1957, has been due rgely to effective control of maintence practices. Complete and novel cord systems, standard procedures ecified by a set of Diesel Maintence Bulletins distributed to all mainnance terminals, and a thoroughly-veloped preventive and progressive aintenance program characterize this ntrol.

The preface to the Diesel Maintence Bulletins spells out a primary m of the Burlington's mechanical dertment: "The requirements for inpection and maintenance outlined in e CB&Q Diesel Maintenance Bulletins e primarily for the purpose of avoidg or minimizing road failures. This policy is based on the concept of preventive and progressive maintenance so that locomotive difficulties will be foreseen and corrected before road failures occur."

Clyde (near Chicago) Lincoln Neb., and Denver are the main servicing and maintenance points for the road freight units. All three terminals have drop tables, and Lincoln has the only wheel truing machine on the railroad. Galesburg and Lincoln are also centers for extensive local freight operations. Locomotives are generally assigned to a single terminal for federal inspections lubricating oil changes, truck work, engine component overhauls, and steam generator overhauls.

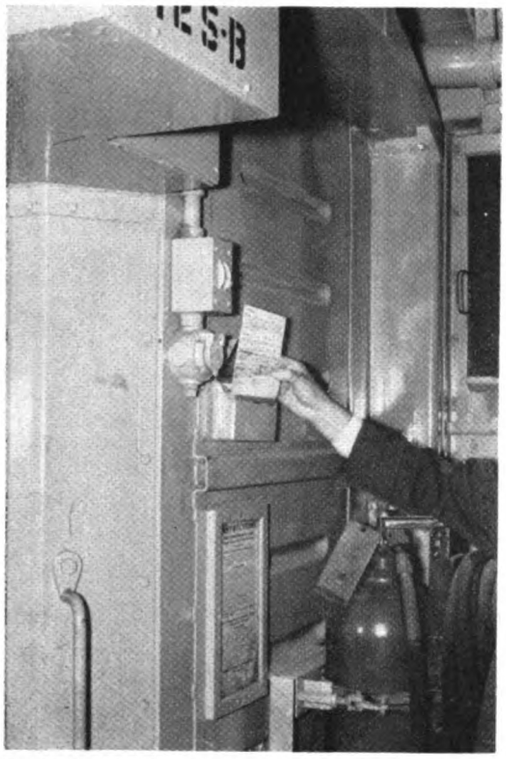
Since its installation, the Burlington has made extensive use of the Standard wheel truing machine at Lincoln. Need for wheel truing is based on inspection reports. Through cooperation with dispatchers, units are worked to Lincoln —usually making sure that this is done between "trip" and federal inspections. A wheel record card is carried on passenger locomotives to show where wheels were turned or applied.

Burlington Route Special Report

Trip Inspections

"Trips" in Burlington parlance are the accumulation of specified mileages by road locomotives and form the in-

Component Parts Records Are Carried on Locomotives...



1658

Kind of Part _____ Serial No. _____

Test of:

Unit No.	Engine Serial	Cyl No.	Date Applied	Date Removed	Reason for Removal

Form 1721-C Rev. B

LUBRICATION RECORD OF DIESEL ENGINE SERIAL NO. _____

UNIT NO. _____ LOCATION _____

LOG OF LUBRICATING OIL CHANGES

DATE	TRIP NO.	KIND OF OIL

NOTE NO. 1

(a) It is important when making Lube Oil change that strainer screens, filters, and lower crankcase oil pan be checked for evidence of foreign particles. If any are found, it must be called to the attention of the Foreman in charge.

FORM 1721-D REV. A

RECORD OF TRACTION MOTOR NO. _____ TYPE MOTOR { OIL (PASS. - 5 TRIPS, FREIGHT - 10 TRIPS) / GREASE (PASS. - 8 TRIPS, FREIGHT - 16 TRIPS) }

LOCO.	POS	DATE APPLD.	DATE REMVD.	MAINTENANCE TRIP NO. APPLIED	MAINTENANCE TRIP NO. REMOVED	REASON FOR REMOVAL

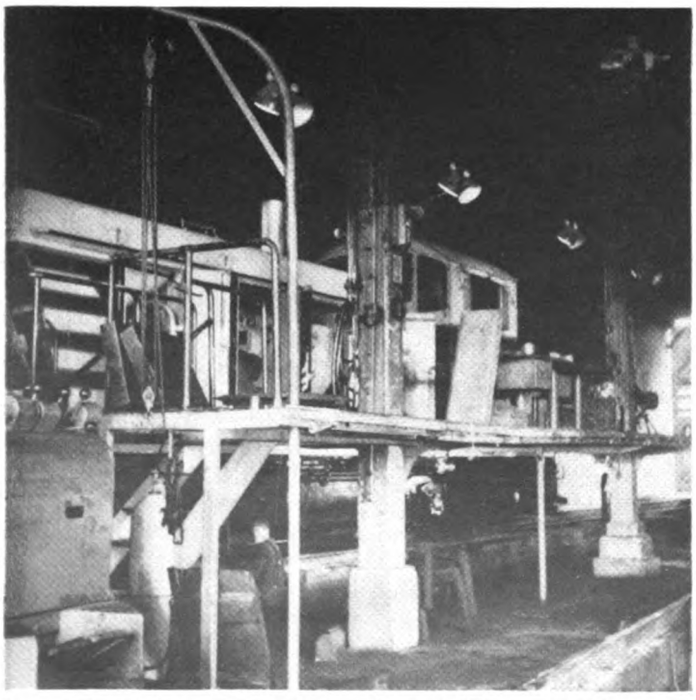
LOG OF LUBRICATION

TRIP NO.	DATE LUB.	TRIP NO.	DATE LUB.	TRIP NO.	DATE LUB.	TRIP NO.	DATE LUB.	TRIP NO.	DATE LUB.	TRIP NO.	DATE LUB.

Card index box installed in the car body of each unit provides space for carrying crankcase lubrication record cards, traction motor record, and sets of record cards for all pistons, cylinder heads and cylinder liners on the unit. All of these are then immediately available when the need arises.

tervals which are followed by the scheduled maintenance work. Trip inspections are made on each road freight locomotive each time it has operated approximately one thousand miles and on passenger units after each two thousand miles. Switchers are on scheduled 15-day or monthly maintenance cycles —or "trips," at the discretion of local supervision.

The work performed at each of the scheduled inspections is completely specified and rigorously observed by the terminals. The individual jobs for any one inspection are dispersed through



Tri-level facility in one end of the roundhouse at Galesburg is used for work on diesel units serviced there.

Wheel work for road locomotives is handled on this Standard Wheel truing machine at Lincoln.

: units to minimize interference and :ed the locomotive's dispatchment. ch component which requires inspec- n adjustment, or lubrication to as- :e its reliable operation is scheduled th sufficient frequency to produce s result. The functioning of the Burl- gton's preventive maintenance pro- am is a variation of the "slide rule" maintenance system. Instead of the actual slide rule, the Burlington uses its own system for controlling the preparation of work sheets for each units when a locomotive arrives at a maintenance terminal.

The pooling of freight power frequently means that units do not return to the same terminal for each successive "trip" inspection. Instead it is the job of each maintenance terminal, where such units may come for sanding and fueling between individual runs, to perform the proper maintenance cycle if the locomotive has accumulated sufficient mileage prior to its arrival there. The information comes from a log book

(*Continued on page 29*)

Typical DMB Specifies Diesel Storage Procedures

BURLINGTON LINES

iesel Maintenance Bulletin—No. 20 Gen. Chicago, May 20, 1958

All Diesel-Electric Locomotives

ibject: Procedure for Storage of Out-of-Service Diesel-Electric Locomotives

. CONDITIONS GOVERNING LOCOMOTIVE TORAGE:

1. Class of locomotive; 2. Length of orage time; 3. Points of storage; 4. Inde or outside storage; 5. Humidity; . Temperature changes.

Basically, all diesel locomotives will be iven the same general preparation to over a period of up to one year, if need e. The storage protection hereby afforded will cover all normally anticipated veather conditions regardless of inside or utside storage. The points of storage are o be left to the discretion of the master iechanic charged with the unit maintenance unless otherwise instructed.

:. ENGINE PREPARATION:

1. Drain engine cooling system; 2. Drain fuel oil heaters; 3. Remove water ump drain plugs; 4. Remove cylinder ead plugs (201-A only); 5. Remove exaust elbow plugs (201-A only); 6. Blow ooling system with compressed air; 7. All drain valves and necessary plugs are o remain open; 8. Drain lube oil system engine temperature not to be less than .50 deg F at time of draining); 9. Remove lube oil filters and clean tank; 10. Open cylinder test valves; 11. Cover engine exhaust stacks with suitable water roof covers; 12. Fill engine governor to iller cap and plug sight glass vent with wood plug; 13. Tag in area of start button—"Engine water and oil are drained"; 14. Engine air filters to be removed and suitable blanking plates applied removed filters are to be stored in engine room and cleaned prior to putting unit into service).

It is felt that insufficient oxidation will occur in the cooling system to preclude the need and added expense for any special stabilizing oil or compound to be used. Water treatment residue should be sufficient. Gaskets and seals should not present too great a problem in a service-seasoned engine. Normal expansion will be resumed upon application of hot water to system prior to putting engine in service. Drain valves left in open position will compensate for condensation due to humidity. Fuel oil filters are to be cleaned or renewed prior to putting engine into service. Lube oil retention of affected parts will afford adequate film protection until such time as the system is purged and charged with oil (warm preferably), prior to putting engine in service.

3. ELECTRICAL PREPARATION:

1. Main generator, add ¼ pint of MMG oil regardless of prior application date; 2. Auxiliary generator—no preparation; 3. Traction motors—no preparation; 4. Electrical cabinets—remove all fuses, open all circuit breakers, and pin reverser in neutral position; 5. Batteries—disconnect positive and negative leads (also center taps where used) and tape lugs; batteries are to be fully charged at time of storage, and specific gravity is to be maintained not less than 1,200 at all times.

Cleaning and blowing are not necessary upon storage. But, all electrical equipment will be blown, cleaned and inspected prior to putting unit into service. Brush tension is of no concern and brush spotting of commutators will be eliminated by periodic movement of equipment as outlined in Item 8. The prescribed equipment movement will also take care of lubrication needs of the electrical equipment. Battery freezing and excessive discharge will be avoided if handled as outlined.

4. CARBODY PREPARATION:

1. Seal all roof openings with waterproof Sisal Kraft paper and waterproof pressure sensitive tape; 2. Seal all carbody side air intake openings with waterproof Sisal Kraft paper and waterproof pressure sensitive tape; 3. All carbody air filters are to remain in proper location, but filters are to be cleaned prior to putting unit into service; 4. Empty sand boxes; 5. All doors are to be closed and securely fastened.

5. AIR SYSTEM PREPARATION:

1. Drain compressor lube oil crankcase and tag to indicate it has been drained (tag to be located in area of engine start button); 2. Insure that all water is drained from water cooled air compressors where used: 3. Drain all air lines, sumps, dirt collectors and reservoirs of condensate (drains to remain closed while in storage to prevent entry of insects into air system); 4. Air hoses are to have dummy coupler carriers connected, or remove hose and insert pipe plug where dummy couplers are not provided (hoses are to be stored on the unit when removed).

There will be insufficient deterioration of air compressor diaphragms during storage to affect proper operation. Current inspection and maintenance practices will amply cover this item. Air compressor lubrication will be afforded under prescribed equipment movement.

6. STEAM GENERATOR PREPARATION:

Adhere to existing instructions for laying up various models of steam generators and boiler water supply systems.

7. MISCELLANEOUS PREPARATION:

1. Water coolers to be drained; 2. Toilet water tanks to be drained (where used); 3. Auxiliary engine water tanks to be drained (where used); 4. Remove water piping drain plugs of 4915 or standby heaters (where used); 5. Fill fuel oil supply tank to capacity (water to be drained from tank sump prior to putting unit into service). Fuel oil supply tanks should be filled to capacity upon storage to reduce atmospheric area and resultant condensation possibility.

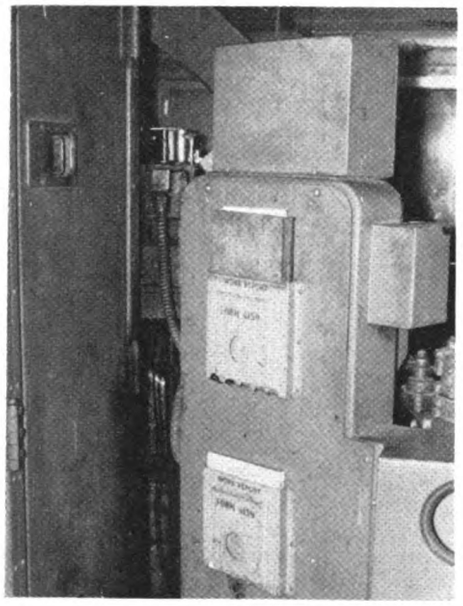
8. GENERAL:

1. Bar engine over at least one complete revolution once per week (engage cooling fan clutches where used); 2. Move stored locomotives at least once per week; 3. Examine condition of carbody opening covers and external doors at least once per week while in storage to insure original tightness.

If a locomotive has been stored for a period of one year (12 consecutive calendar months), it will be placed in running condition, started and power tested. If conditions are satisfactory, the locomotive will be given the above storage preparation for continued storage. Any defects noted during this inspection will be remedied prior to further storage.

Outlined equipment movement will properly protect lubricated parts, such as main bearings, connecting rod bearings, gears, pistons, liners, top deck assemblies, wheel journals, etc., from corrosive etching. This movement will also flex and reposition belt drives where used to prevent a detrimental "set" to occur.

How Scheduled Maintenance Operates . . .



Left: Log book in place in rack on back of SD unit control stand here, is carried on each cab unit. In it, supervisors and terminals report on unusual performance, specific repairs required, component parts changed out, and mileage accumulated by the locomotive.

Right: Data from log book and from maintenance record, along with schedule from proper routine maintenance cycle (in ring binder) provide data for making out the routine maintenance work sheets at the conclusion of each "trip".

Below: Current record of routine maintenance work is carried with log book. With data from this, the work sheets for the next "trip" are prepared. "Trips" are approximately 1,000 miles in freight service and 2,000 miles in passenger service.

Form 1721-M

PERFORMANCE RECORD FOR BATTERIES IN DIESEL LOCOMOTIVES

LOCO. _____ MONTH OF _____

BATT. NO. _____ DATE NEW _____ APPLIED _____ REMOVED _____
BATT. NO. _____ DATE NEW _____ APPLIED _____ REMOVED _____
BATT. NO. _____ DATE NEW _____ APPLIED _____ REMOVED _____

DATE	INSPECTED AT	VOLTAGE LTS.	VOLTAGE BATT.	GRAVITY	FLUSHING AND SOLUTION HEIGHT	INSPECTOR
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REMARKS

Form 1721-A REV. B

MAINTENANCE RECORD
DIESEL - ELECTRIC LOCOMOTIVES

LOCO. NO. 121

TRIP NO.	PLACE	DATE	DEFERRED MAINTENANCE ITEMS
49	Clyde	10-24-58	
50	Clyde	10-27-58	
51	Clyde	10-31-58	
52			
53			
54			
55			
56			
57			
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BURLINGTON LINES 49
DIESEL ROUTINE MAINTENANCE

TRIP No. 52 50

UNITS	ITEM	
X	1	OIL CHANGE MILEAGE:
AB	2	Frt. —40,000
CD	4	Psgr.—48,000
A	5	
AB	8	
X	9	
X	12	
X	13	MILEAGE FOR LUBR. OF TRACTION MOTOR ARMATURE BEARINGS:
X	14	FRT. & PSGR.
X	16	Oil —10,000
X	17	Grease —16,000
X	19	
A	21	
X	24	
AB	26	
X	36	
X	38	Check Date For
X	39	Following Inspections:
X	48	Monthly
X	50	Quarterly
C	51	Semi-Annual
C	53	Annual
C	59	
X	60	
X	61	
X	62	
X	64	LEGEND:
D	67	Freight:
X	73	X—All Units
X	75	A—A-Unit
X	77	B—B-Unit
X	78	C—C-Unit
X	79	D—D-Unit
X	80	Passenger:
X	81	Both Engines if
X	84	"X" or "A" appears.
X	86	Other Letters Can
X	93	Be Disregarded.
		Switchers:
		X—All Engines
		①—Single Element Filters
		②—Double Element Filters
		③—Quad Element Filters

52

each cab unit carries and in is recorded odometer readings or ıg of the terminals from which ispatchment has been made. For power, the maintenance points 'de, Galesburg and Lincoln, along t. Joseph, Mo.; Alliance, Neb.; ıll Casper and Sheridan, Wyo.; 3rd Street, Denver.

enance Bulletins

sel Maintenance Bulletins not spell out the responsibility for ming each type of work and in- ıg exactly what components are ɔive attention, but they also have worked out to include a whole of standard practices. One of the recent additions to this manual ıe instructions for storing out-of- e locomotives (see box). Such in- ıons are prepared by a committee, st in part on the basis of a series of conferences with supervisors over the entire railroad familiar with the problems involved in the matter under consideration.

These bulletins are not reprints of manufacturers' instruction and data sheets but in every case have been individually tailored for Burlington locomotives and worked out to fit any peculiarities of Burlington operations. The first Diesel Maintenance Bulletin was issued in 1945 and since then they have been expanded to encompass today's 19 General Bulletins, 23 Mechanical Bulletins, 13 Electrical Bulletins, and 5 Boiler Bulletins. Examples of the variety of subjects include Power Truck Overhaul (General), Application and Storage of V Belts (Mechanical), Transition Indicators and Brake Warning Relays (Electrical), and Maintenance of Type 4915 Water Heaters (Boiler).

As one Burlington officer put it the Diesel Maintenance Bulletins are the "key" to all locomotive maintenance. Supervisors are generally not permitted to deviate from the standard procedures except in extraordinary cases. It is a mechanical department instruction that only if the DMB does not cover a topic then the manufacturer's hand book is to be followed. This is the case because the Burlington has found that its operations permit deviations from standards set up by the manufacturers of equipment involved.

Road failures are rigorously studied on the basis of complete reports which must be filed in conjunction with almost every one. All efforts are then made to alter equipment or change maintenance practices to prevent additional delays of the same type. In this the Burlington has been successful. In fact, this diesel pioneer has been obtaining good and economical results from every phase of its locomotive maintenance.

Form 1721-B Sheet 1
Rev. D

ROUTINE MAINTENANCE WORK SHEET - ROAD DIESELS

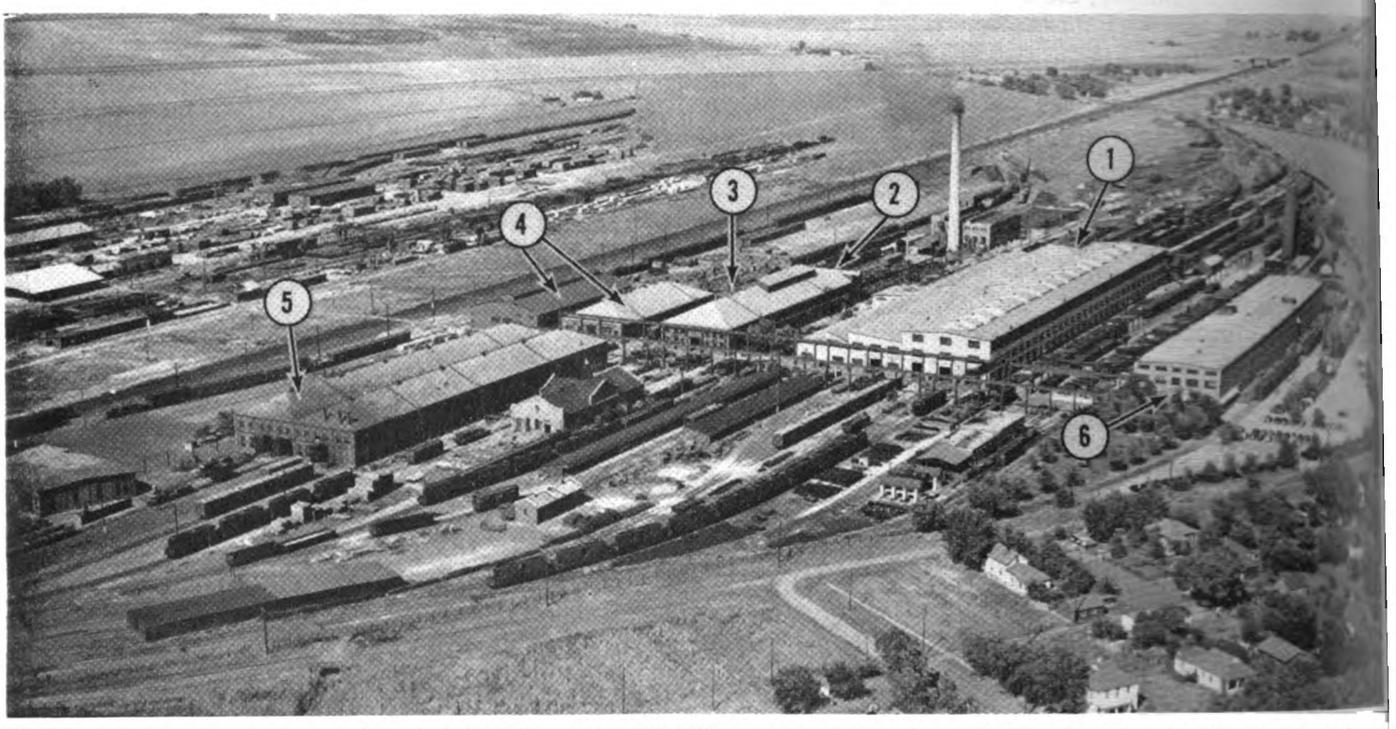
LOCATION CLYDE DATE 11-3-58 FED. INSP. DUE None

LOCO. NO. 121 TRIP NO. 52 MILEAGE READING 76853

	A	B	C	D	MAINTENANCE ITEMS
1	X	X	X	X	1 Inspect cylinder head mechanism while idling
2	X	X			2 Inspect pistons, liners & crank case
3					3 Blow out & drain air box sump
4			X	X	4 Change engine air filters
5	X				5 Clean engine room filters & main generator filters
6					6 Clean sintered bronze & change fuel suction filters
7					7 Change Nugent or Full-Flo filters
8	X	X			8 Drain condensate from fuel filters & tank sumps
9	X	X	X	X	9 Check operation of emergency fuel cut-off & reset mechanism
10					10 Change lubricating oil filters - DO NOT DEFER
11					11 Remove & clean lubricating oil suction strainers
12	X	X	X	X	12 Check operation of P&M engine protectors where used
13	X	X	X	X	13 Check lube oil level & for signs of dilution
14					14 Lubr. speed recorder drive with approved lubricant - Item 42, DMB-18 GEN.
15					15 Make detailed inspection of all "V" belt drives
16	X	X	X	X	16 Check operation & condition of fan clutches (FT's)
17	X	X	X	X	17 Check oil level in fan drive gear boxes (FT's)
18					18 Change oil & flush traction motor blower, and inspect chain drives
19	X	X	X	X	19 Check cooling system; hoses, gauges, radiators & treatment
20					20
21	X				21 Remove & clean engine radiator screens (FT's)
22					22 Blow out radiator fins
23					23 Clean oil tank breather & crank case breather
24	X	X	X	X	24 Make visual inspection of pressure and temperature gauges
25					25 Fill engine water pump oil cups
26	X	X			26 Lubr. & inspect all jackshafts, idler & cooling fan bearings
27					27 Lubr. clutch pins, rollers and throw-out bearings (FT's)
28					28 Lubr. traction motor blower fans and check vibration
29					29 Lubr. coupler carrier
30					30 Torque Head & Crab Nuts #1 & #2 Style Assy.; Crab Nuts Only on #3 Style.
31					31 Change engine governor oil
32					32 Lubr. Falk couplings & tighten bolts - MURFAK #3 grease
33					33 Lubr. & inspect layshaft & shutter linkages
34					34 Check operation of lube oil pressure & suction switches
35					35 Lubr. & inspect electro-pneumatic governor control linkages
36	X	X	X	X	36 Clean & flush cooling system when sight glass shows rust, dirt or oil

rk sheet specifies the 96 items which are covered under the scheduled maintenance program. It is marked for jobs to be performed on individual units for specific trip inspection. Information is taken from proper Maintenance Routine (facing page), and individual jobs are signed by workmen when completed.

Burlington Route **Special Report**



Three-hundred acre plant at Havelock, Neb., includes (1) car shop which builds most of Burlington's new freight cars and makes heavy repairs to older cars. Other buildings important to car production include (2) blacksmith shop, (3) track scale, (4) lumber storage, (5) paint shop and (6) storehouse and office. Lumber processing plant is across the main line at upper left.

Along With Repair Programs...

Burlington Builds Its Own Freight Cars

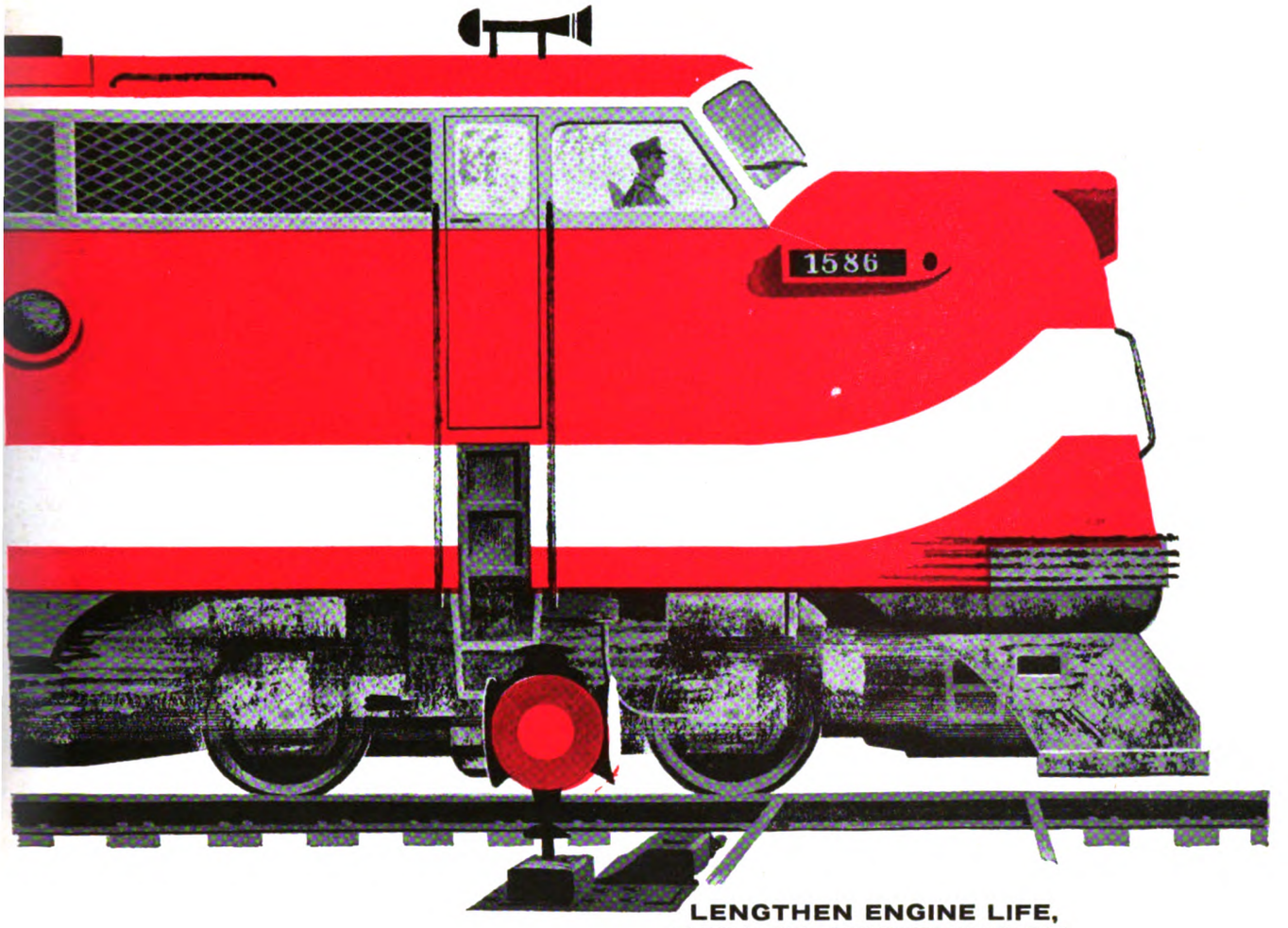
Havelock shop has turned out new cars every year since 1936; mill gondolas and DF box cars will be next off these production lines

THE LOW AVERAGE AGE of the Burlington freight car fleet and the excellent condition of most of these cars largely reflects the steady activity of the road's freight car shop at Havelock Neb., a few miles east of Lincoln. Nationally in recent years an increasing proportion of new freight cars are being built by individual railroads at their own car shops. Such new car construction is a field where the Burlington has vast experience.

Building programs at Havelock every year since 1936 and at Galesburg, Ill. until operation of the Steel Car Plant there ceased in 1941, have produced most of the present Burlington freight car fleet. In the past 21 years Havelock has turned out 33,720 new cars. These have been of almost all types. The shop has just completed the building of 350 covered hoppers. Even in a year when there have been reduced carloadings, the Burlington had turned out 1943 new cars at Havelock by November 1. By the end of December, this year's production will have included standard insulated and DF box cars; the covered hoppers; and 65-ft mill gondolas.

Burlington car building reached its peak in 1953 when 3,401 cars were turned out at Havelock. Despite its car building experience and facilities, the Burlington has frequently turned to car builders for some of its new freight equipment.

General American has built Airslide covered hoppers for the Burlington. Only a few months ago, Pullman Standard turned out the first 100 of its new "super jumbo" standardized PS-2 covered hoppers for CB&Q grain service. These were the first such cars to be built with a capacity of 3,219 cu ft. At the same time, Havelock was producing 35 covered hoppers of more conventional size and design. Building programs for 1959 have not been announced.



LENGTHEN ENGINE LIFE, REDUCE MAINTENANCE

Esso Airfil Coating Oil adds outstanding dirt pick-up properties to diesel air intake filters. Airfil protection is so effective that it pays off handsomely in reduced abrasive wear, lowered repair costs, longer engine life. ¶ Airfil also shows superior wicking qualities. Successive layers of dirt and dust are quickly wetted, exposing a fresh, efficient dirt-retaining surface at all times. ¶ Applying Airfil is simple. It goes on rapidly as a hot liquid and cools to a gel-like solid that retains its consistency at engine-room temperatures. And since Airfil is insoluble in water, it stays on the filters, even in the wettest weather. It can, however, be readily removed by a hot detergent wash or a steam blast.

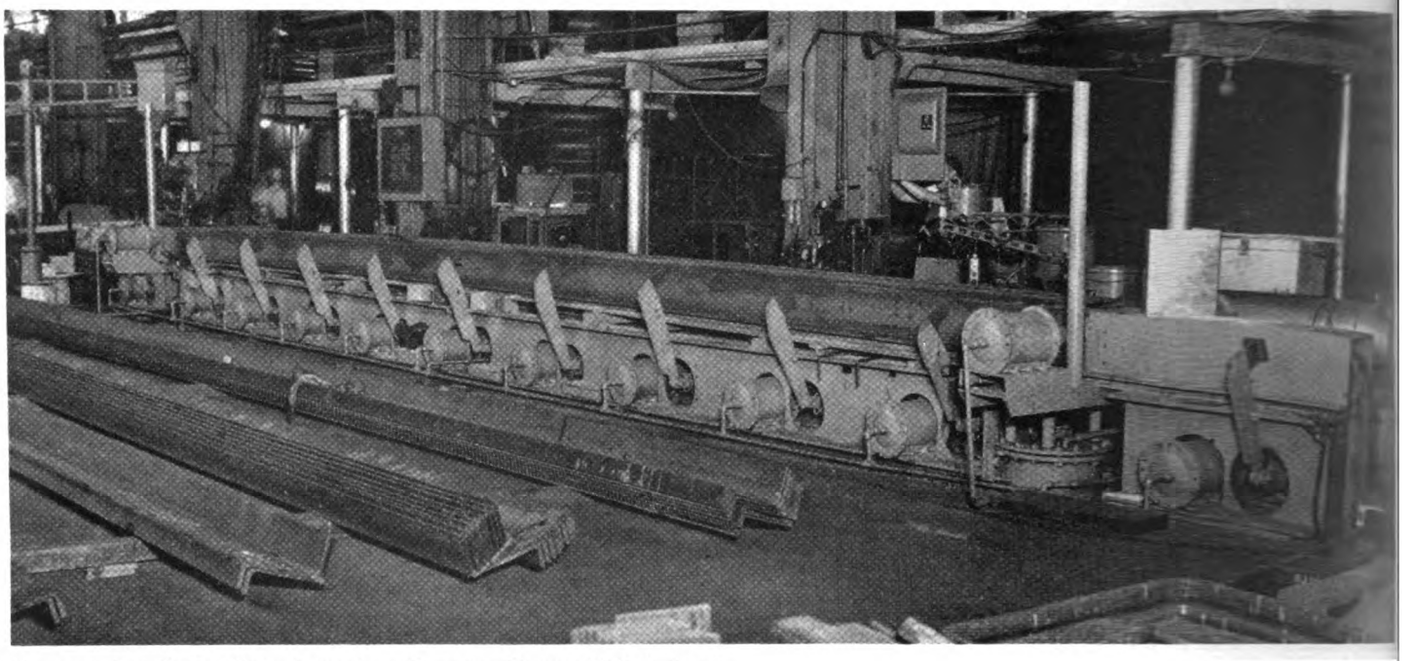
Airfil's cost-cutting advantages make it ideal for passenger car air-conditioner filters too. For further information or technical assistance, call your local Esso office, or contact: Esso Standard Oil Co., Railroad Sales Division, 15 W. 51st St., New York 19, N.Y.

perfected by research . . . proved in performance

AIRFIL®

Esso

RAILROAD PRODUCTS



Air-operated cambering device is used on all center sills over 40 ft in length.

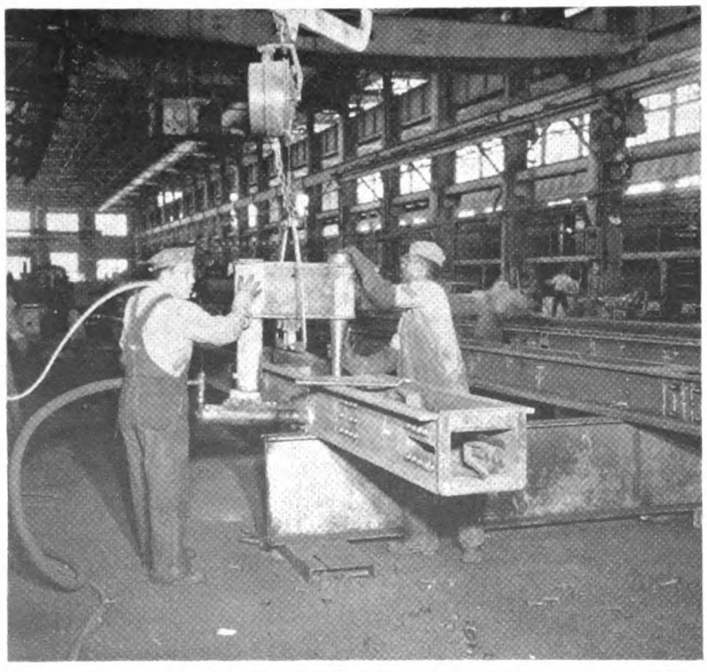
Havelock has also built streamlined baggage cars. Most roads turn to car builders for such passenger equipment.

Repair Programs

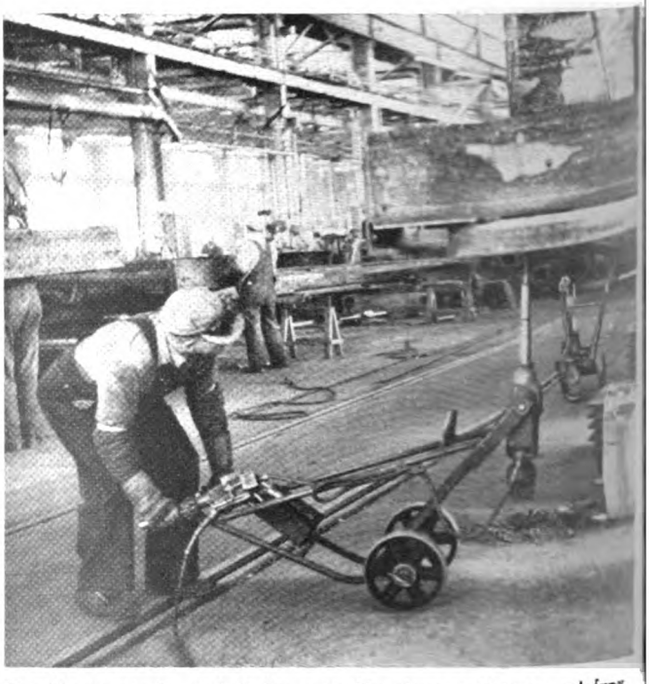
With all this emphasis on new car building it should not be assumed that the shop has been ignoring the existing car fleet. Three tracks run through the main car shop, a building 216 ft wide and 603 ft long. Any one of these three tracks can be utilized for either heavy repairs or new construction. The order for 350 new covered hoppers just completed, came off the No. 2 track production line at the rate of six per day. On a second line, 500 gondolas (built in 1936 and 1937) have been receiving heavy repairs at the rate of five per day. These composite gondolas generally need end sills cover plates new flooring, and new side planks. The third track at Havelock has been making repairs to 100 cabooses.

Cars of the same series are scheduled in lots for program repairs through a specially tooled repair line. Inspections and records over the years disclose defects that are common to each type of car. Generally, two or three individual cars are stripped down completely to determine the extent of repairs and changes needed. On this basis a bill of material and shopping program are prepared to cover the entire series.

Heavy repairs are classified as those requiring more than 20 manhours per



Pneumatic riveter is used in fabricating bay where underframes are built up.

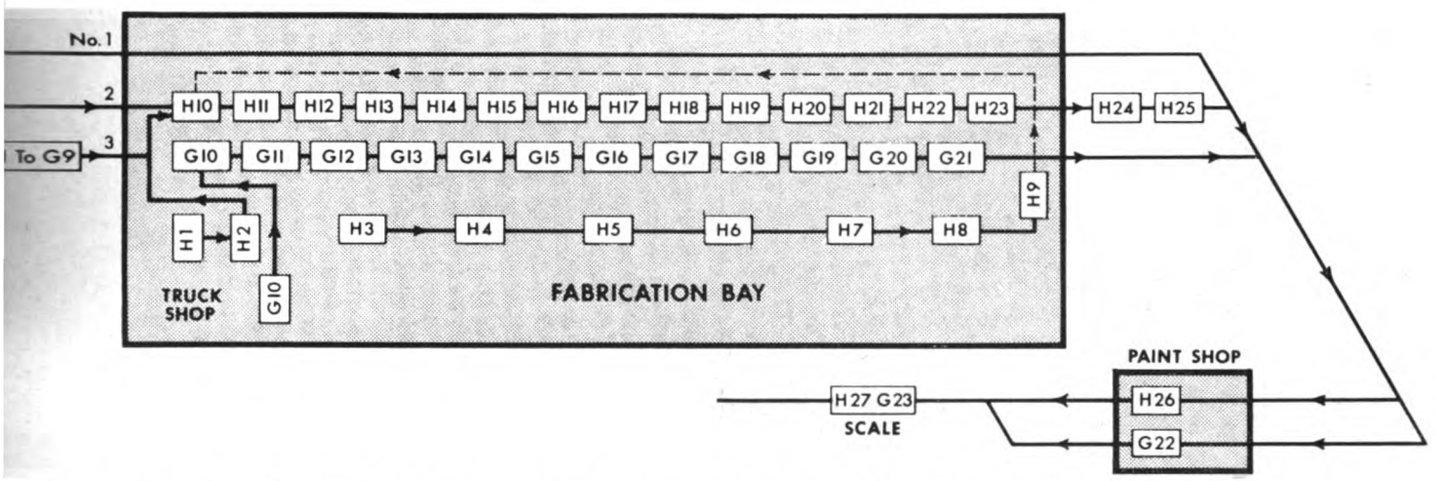


Portable reamer is used during assembly of covered hopper underframes.

It has been the Burlington's ex- ence that new cars produced by shop will be due for their first y repairs about as follows: Box —7 to 10 years; hopper cars—12 to 14 years; composite gondolas—6 to 8 years for wood components and 12 to 14 years for steel parts; steel gondolas—12 years; and flat cars—10 years. After these first heavy repairs have been made cars are then considered to be serviceable for seven years or longer—time varying with the type of car.

(*Continued on Page 36*)

w Havelock Production Lines Have Been Arranged...



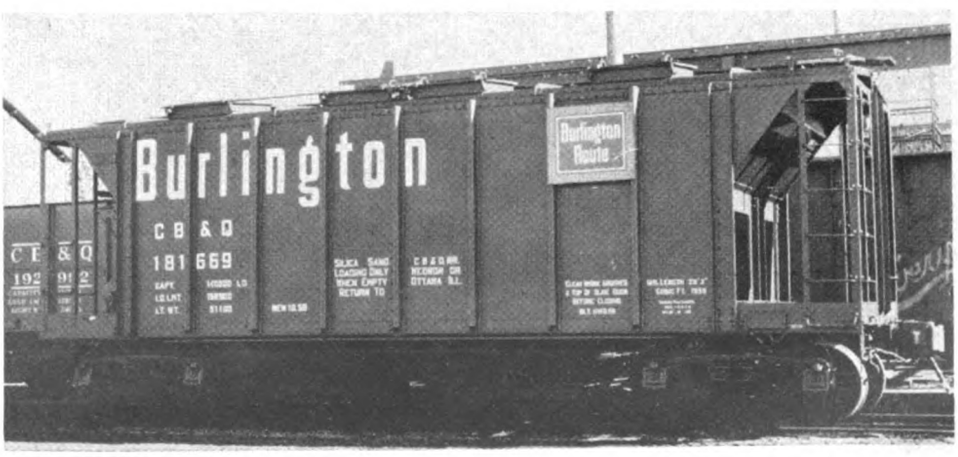
Production runs just ending at Havelock have been turning out new covered hopper cars and repairing composite gondolas. These lines used two of the three shop tracks. The other track is being used for caboose repairs. Tracks are assigned for various operations as the need arises.

w Covered Hopper Assembly Line Six Cars per Day

1—Wheels bored, axles turned, and wheels mounted in wheel shop.
2—Trucks assembled and equipped with lubricator pads.
3—Center sills, side sills, top side plates punched on spacing machine.
4—Two channels, bolted back to back, punched for covered hoppers.
5—Center sill assembly including installation of stiffener angles from bolsters out to ends; strikers, center fillers, and separators fitted in and riveted.
6—AB brake valve installed. Bolsters put in place along with slope sheet connections to underframe.
7—All holes reamed.
8—Riveting completed.
9—Frame placed on dolly in cross track for movement to H10 position.
0—Frame placed on trucks, slope sheets, hopper sheets, hood sheets, center partitions and center partition braces applied. Braces are riveted. (Additional frames are available outside at both ends of shop to keep line in production in case of power failure in fabrication section.)
1—Sides, end posts, outside hopper sheets, and safety appliances bolted in place. Stiffeners are welded on the sides.
2—Hatches and center roof sheets bolted in place.
3—Discharge door castings applied and welded.
4—All holes on sides, ends and safety appliances reamed.
5—Hopper sheets placed in position and bolted in place.
6—Hopper sheets and discharge valves are welded.
7—Sides, safety appliances; and center partitions are riveted.
8—Slope sheets are welded.
9—All brake equipment applied.
20—Hatches and roof welded.
21—Roof rivet holes at side plates and ends reamed along with seam caps.
22—Safety appliances and roof riveted.
H23—Air brakes and discharge valves tested. End roof sheets and running boards applied.
H24—Visual inspection inside and necessary welding to seal leaks.
H25—Water test for leaks in welds.
H26—Painting.
H27—Weighing and stencilling.

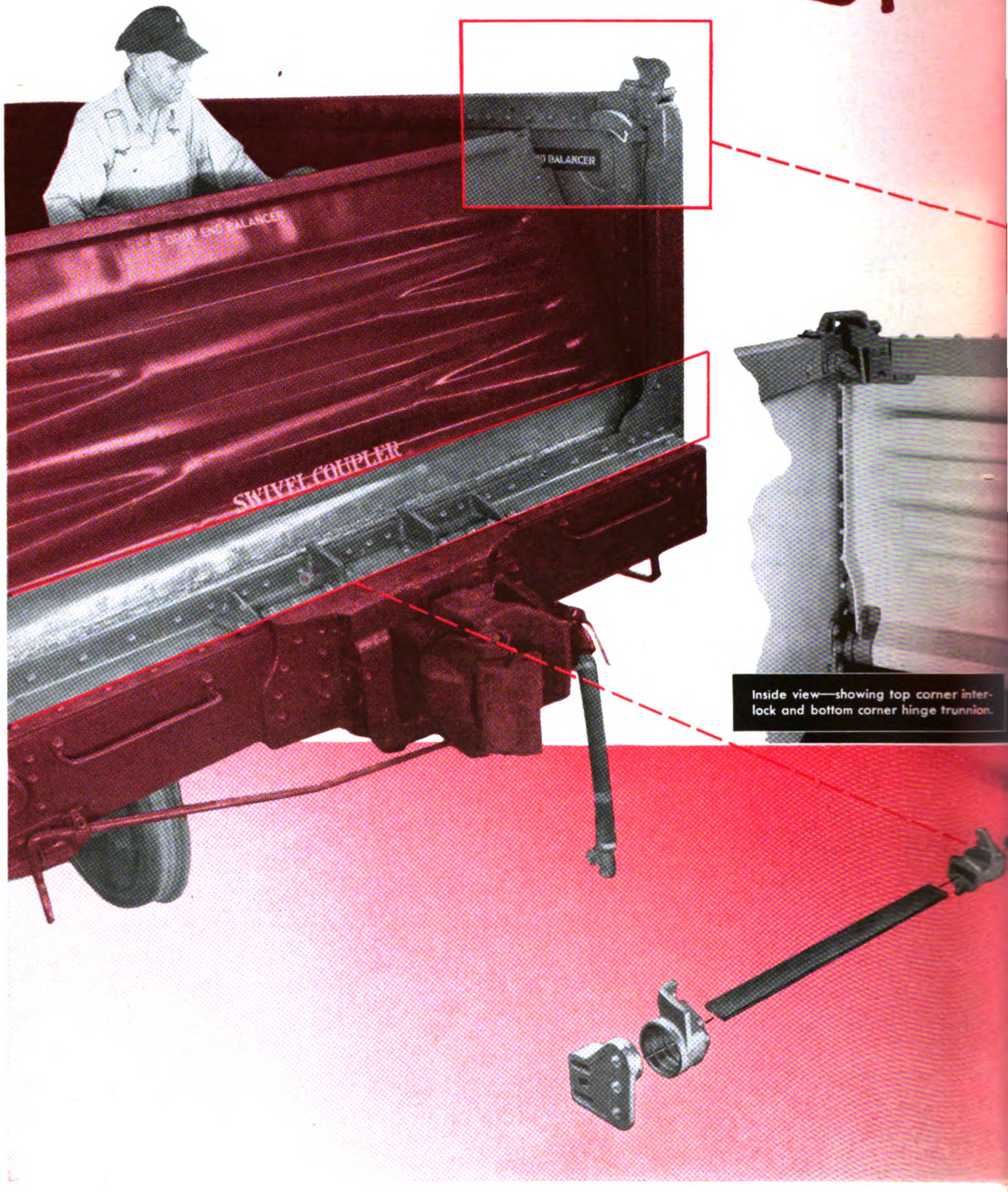
Composite Gondola Repair Line Five Cars per Day

G 1—Siding and safety appliances removed where necessary.
G 2—Flooring removed including doors. Doors may be salvaged.
G 3—End sills, top cover plates, posts, and diagonal braces removed where necessary.
G 4—Rivet buster or torch used to remove all rivets from old steel framing. All loose rivets removed.
G 5—Draft gears and yokes dropped and placed on truck for installation after inspection. Paint steel framing with red lead.
G 6—Necessary new steel parts placed in car by crane.
G 7—New steel parts installed and fastened with fit-up bolts.
G 8—Top chords straightened if necessary.
G 9—All holes reamed for rivets.
G10—Car is jacked; trucks are removed for overhaul and replacement; and reconditioned trucks applied. Draft gears installed with yokes and fillers. All rivets are renewed at draft sills.
G11—All new steel components riveted, including coverplates on center sill and cross bearers.
G12—New flooring fitted and bolt holes drilled.
G13—Floors bolted and door openings covered with temporary plywood.
G14—Necessary siding and end lining placed on floor of car by crane.
G15—Siding and end lining put in place and tacked with temporary nails.
G16—Air brake equipment removed, cleaned, and tested.
G17—Siding, end lining and safety appliances bolted. New piping installed, if necessary.
G18—Air brakes tested.
G19—Drop doors applied and all necessary welding completed.
G20—Final inspection.
G21—Inspection defects corrected.
G22—Painting.
G23—Weighing and stencilling.



Cast Steel
INCORPORATED DROP END UNITS

Spee

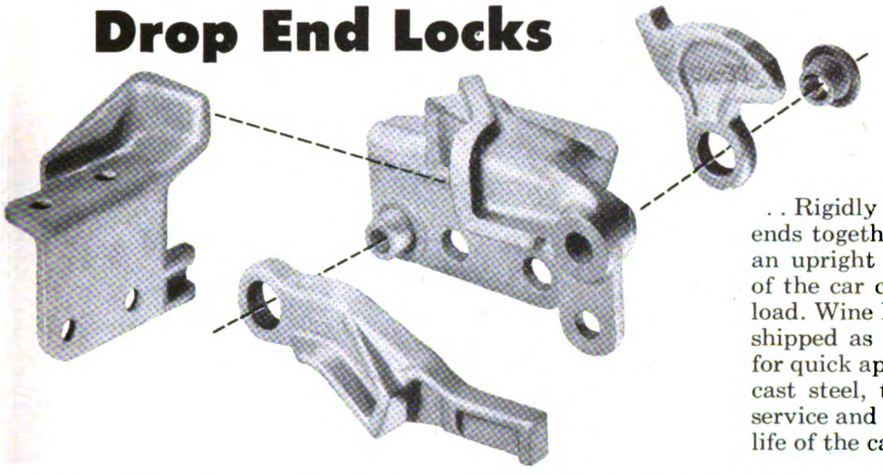


Inside view—showing top corner interlock and bottom corner hinge trunnion.

rvice.. Sustain Structure

For outstanding economies . . . increased safety factors . . . improved strength and durability for the life of the car—Wine Drop End Units (Locks and Balancers) form *the perfect* combination!

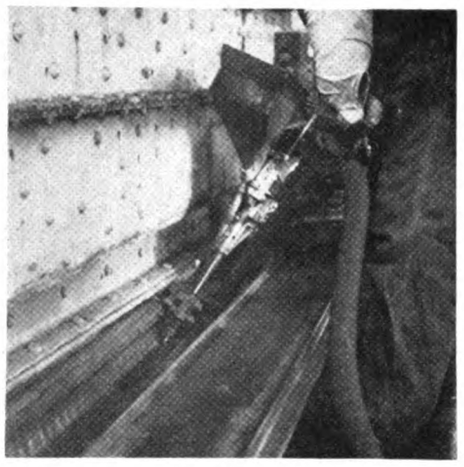
WINE
Drop End Locks



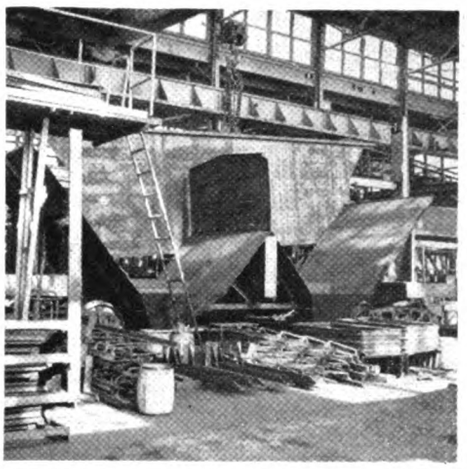
. . Rigidly interlock gondola sides and ends together—securing the ends in an upright position. Top corners of the car cannot spread regardless of load. Wine Drop End Locks are shipped as an assembled unit, ready for quick application. Made of electric cast steel, they insure maximum service and durability throughout the life of the car.

WINE
End Balancers

. . Eliminate the necessity of using *our or five men* to close a drop end for ar loading! Multiple spring steel tor- ion bars, incorporated between the enter casting and the two outer hinge runnion castings, permit *one man* to eadily close the heaviest drop ends vithout assistance. Available for easy pplication on most drop end gon- olas.



Submerged-arc welder is used for application of side stakes to side sheets in jig.



Completed side is lowered into position after floors and partition have been placed.

Electric-resistance type rivet heaters are used at many points through the shop.

(*Continued from Page 33*)

Materials for new and repair programs are under the jurisdiction of the stores department at Havelock. Car production goes on during the first shift, and the entire line is stocked during the second shift for the next day's work. The blacksmith and fabricating shops turn out many parts, but the Burlington makes extensive use of fabricated assemblies such as car sides.

New car programs completed this year include 1,500 standard 40-ft 6-in. box cars, 25 DF box cars 100 insulated DF-RBL box cars, and 350 covered hoppers. The line has now been set up to build the fifty 65-ft mill gondolas. Shortly the last program for 1958 will get under way. This will call for the building of 100 DF cars.

All new and program repair cars turned out this year have been equipped with lubricator pads, complying with AAR requirements. A system-wide lubricator application program is under way. Havelock is the system reclamation plant for these lubricator pads. The Railway Service and Supply Co. operates the Havelock plant, using the same equipment formerly used for renovating waste. The process is said to be quite satisfactory with all renovated pads meeting the present AAR requirements.

Modern machines and equipment, along with many time-saving devices make it possible for both new and repairs cars to move out of Havelock car shop with clock-like regularity.

BURLINGTON
BAD ORDER RATIO
Ratio of Bad Order Freight Cars to Total Ownership (%)

	Burlington	Class 1 Railroads
1955	3.2	6.0
1956	3.6	4.2
1957	3.3	4.6
1958*	3.4	6.1

* - Ten Months

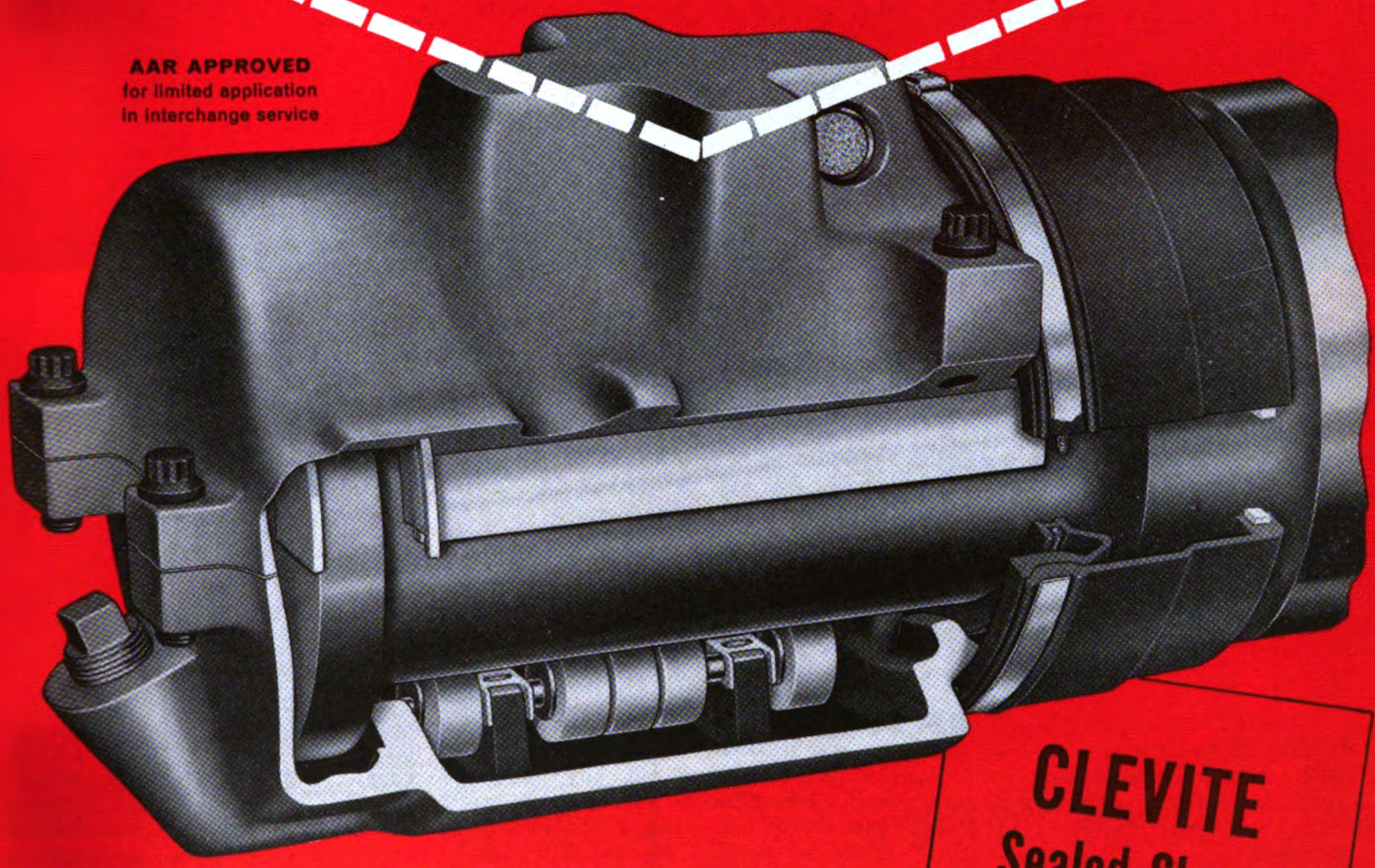
New car construction programs, systematic retirements and consistent repair programs have resulted in a freight car bad order ratio which is usually better than the national figure.

Platform between production lines simplifies work on car roofs and upper sides. Materials can be handled by overhead cranes.

Materials are stocked close to points of application. Here they are on elevated platform. Production lines are completely restocked on second shift.

KEEP YOUR EYE ON CLEVITE

AAR APPROVED
for limited application
in interchange service



CLEVITE Sealed Sleeve Bearing Cartridge

...new, permanent, soundly engineered and economical journal bearing conversion for freight cars.

WHAT TESTS SHOW In continuing road and laboratory tests, under the hardest service and simulated operating conditions, the performance of Clevite Cartridges has far exceeded all expectations.

Also experience from the growing number of applications shows that Clevite Cartridges require less modification of equipment, are installed at lower cost than any other comparable conversion. ***WATCH FOR MORE TEST RESULTS!***

DISTRIBUTED BY:

STANDARD CAR TRUCK COMPANY

The CLEVITE Bearing Cartridge is a development of Cleveland Graphite Bronze division of Clevite Corporation

332 S. Michigan Ave., Chicago 4, Illinois. *In Canada:* Consolidated Equipment Co., Ltd., Montreal 2, Quebec

With Burlington's Intensive Utilization . . .

Diesels Are Shopped on Time Basis

West Burlington gave general repairs to 184 units last year and has matched this pace in 1958

GENERAL REPAIRS to Burlington locomotives are made on mileage and time basis. Actually variations in the time cycles for shopping do represent locomotive mileages and load factors. Utilization is high on all units and efforts are made to assure that individual units of each class do about the same work. This equalization is frequently achieved by swinging locomotives in or out of high mileage and high load-factor pools.

The road's E-9, E-8 and some of the E-7 passenger units are on a three- and six-year shopping schedule. The remainder of the E-7's and all the E-5 units are overhauled under a two-four- and six-year schedule. Freight locomotives are generally on a two-four-, and six-year schedule although the three-unit FT, F-2, F-3 and F-7 locomotives are now on a three- and six-year cycle along with the GP and SD road switchers. Switching locomotives usually receive general repairs every ten years. After thorough inspections, the switchers may be allowed to operate first eleven and finally up to twelve years maximum before receiving general repairs.

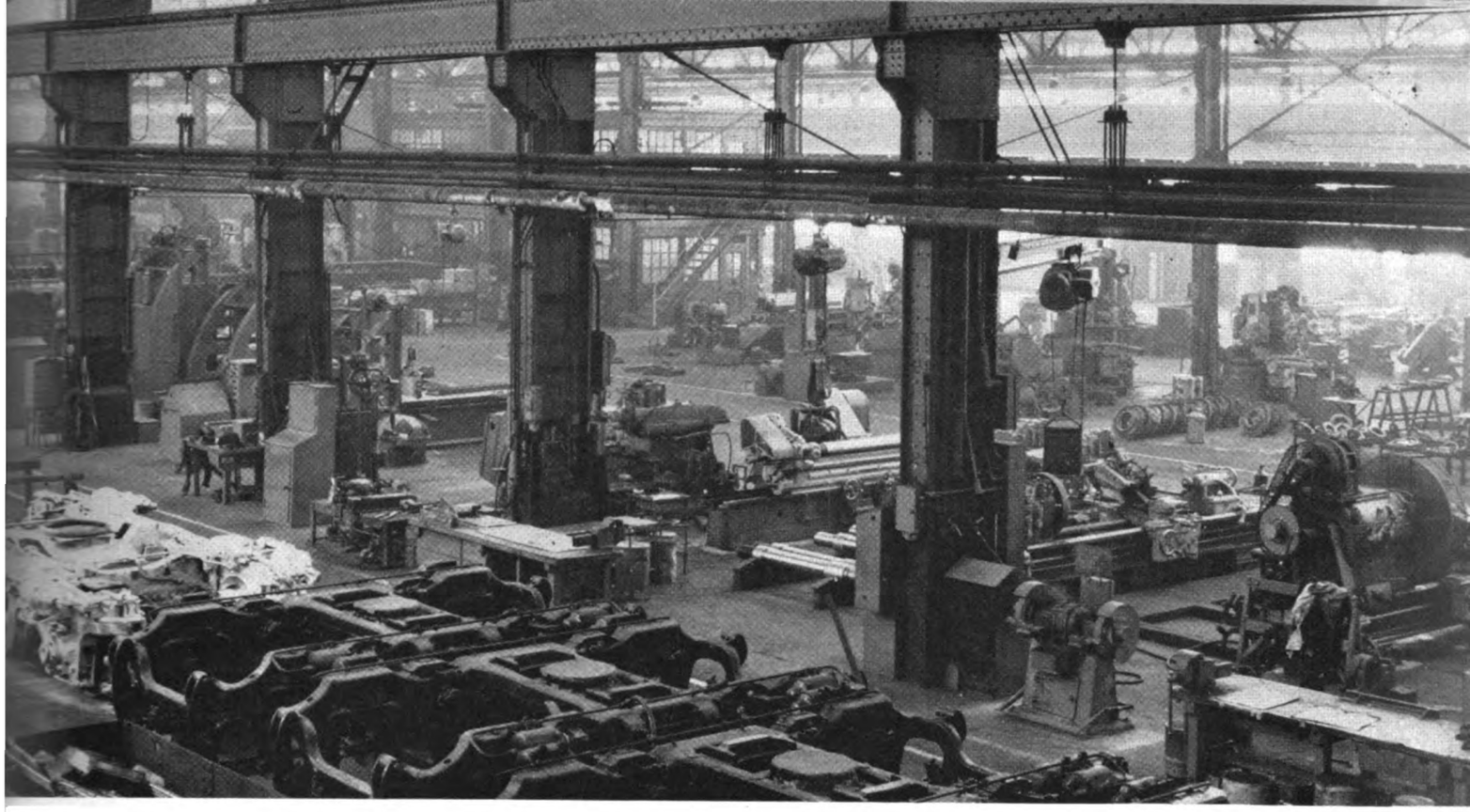
West Burlington, Ia. shop is the major repair facility for all diesel locomotives on the railroad. Running repairs are given at the shop if an outside point does not have the facilities or equipment to do the work. In 1957 general repairs were given to 40 passenger units 80 freight units and 18 switching locomotives. Running repairs average nine per month.

The shop is divided into four bays—diesel erecting, and light and heavy machine bays. There are three repair tracks in the erecting bay, and all are available for repairing any type of locomotive. About 50 to 52 per cent of the repairs made are to locomotives and 48 per cent are repairs to component parts for the stores department. For example power assemblies for the railroad a repaired at West Burlington, (RL April 1958, p32). The surplus, over a above the shop requirement is tur over to Stores. Outlying repair point return all defective power assemblies West Burlington and receive repl ments on an exchange basis. Retur assemblies are torn down; defec parts scrapped; assemblies are reb and returned to stores department. I recent change to increase piston the top groove has been widened $\frac{1}{32}$-i for oversize width rings. If the pe formance is satisfactory all groo may be widened $\frac{1}{32}$-in. with a pos bility of eventually going to $\frac{1}{16}$-in.

Freight trucks are rebuilt every years. Passenger trucks, at present a 30-month period will shortly go 36 months. Switch trucks are reb every ten years. Hyatt boxes are ov hauled on the basis of type of pow varying from three to four years. A most all diesel locomotive wheel a axle assemblies are processed at We

(*Continued on Page 43*)

Burlington Route Special Report



Several multiple-unit diesels will be in shop at one time. Shopping is rigidly scheduled.

TYPICAL MONTH'S MILEAGES
for
BURLINGTON LOCOMOTIVES

(August, 1958)

LOCOMOTIVE TYPE	HIGHEST INDIVIDUAL	GROUP AVERAGE
Four-Unit Freight	16,579	12,588
Three-Unit Freight	10,378	6,924
GP-7 Road Switcher	9,035	4,600
GP-9 Road Switcher	5,507	4,122
SD-7 Road Switcher	11,181	4,942
SD-9 Road Switcher	14,071	8,552
Passenger	25,636	15,317

Intensive utilization and ingenious pooling produce these high locomotive mileages.

Light machine bay at West Burlington processes and reclaims many diesel components. Power assembly overhaul production line is under circular tramrail at center.

Practically all equipment—new or reconditioned—going into Piggy-Back service rides on American Steel Foundries Ride-Control® Trucks.

Designed and developed through research by.....

(Soft riding, that is)

ASF

American Steel Foundries

Prudential Plaza, Chicago 1, Illinois

Canadian Manufacturer and Licensee: International Equipment Co., Ltd., Montreal 1, Quebec
Other Foreign Sales: American Steel Foundries, International, S. A., Chicago

GEARED TO PROGRESS
RI
MEMBER

Week's Work At West Burlington

WEST BURLINGTON overhauls one road freight locomotive almost every week of the year. For the two-year or three-year cycles, these freight locomotives go into the shop for five days and emerge completely overhauled and repainted. This is the schedule regardless of the number of units. The four- and six-year repairs cover additional items such as diesel main bearing renewals, main generator reconditioning including application of new bearings, and overhaul of air compressors, fuel pumps, radiator cooling fans, traction motor blower motors and dynamic brake blower motors. Following is a description of the work done each day during one of the two-year overhauls:

First Day

1. Each workman gets a slip outlining his work assignments.
2. Oil and water are unloaded from the diesel. Lubricating oil is pumped out of the shop through special drain lines.
3. Piping is removed to permit removal of engine. The engine and generator mounting bolts are removed.
4. All diesel engines must be out and on the shop floor at 11 am. This is true regardless of whether the locomotive has two, three or four units.
5. Generators and auxiliary generators are removed.
6. Traction motor blowers and radiator cooling fans are removed.
7. Batteries are taken out. The battery boxes are inspected, washed, and coated with paraffin. Battery gravity is tested and the batteries go back into the battery boxes.
8. Power contactors are removed. They are then repaired, lubricated and have new seals installed. When completed, these contactors are reapplied by the same workmen. All wiring is inspected.
9. Drinking water coolers, fuel pump motors and other small motors are removed, bench repaired, and reapplied.
10. Painters apply primer coat to outside of the locomotive.
11. Every effort is made to completely strip the locomotive this day.

Second Day

1. Interiors of the locomotive carbodies are cleaned.
2. Components removed in process of repair—such as water pumps, fuel pumps, oil pumps and blowers—are reapplied unless they have been found defective.
3. Power assemblies in each of the diesel engines are replaced with completely overhauled assemblies (RL&C, April 1958, p 32).
4. Painters apply second primer coat on outside. Taping for stripes is done.
5. Carbody interiors are painted during the night.

Third Day

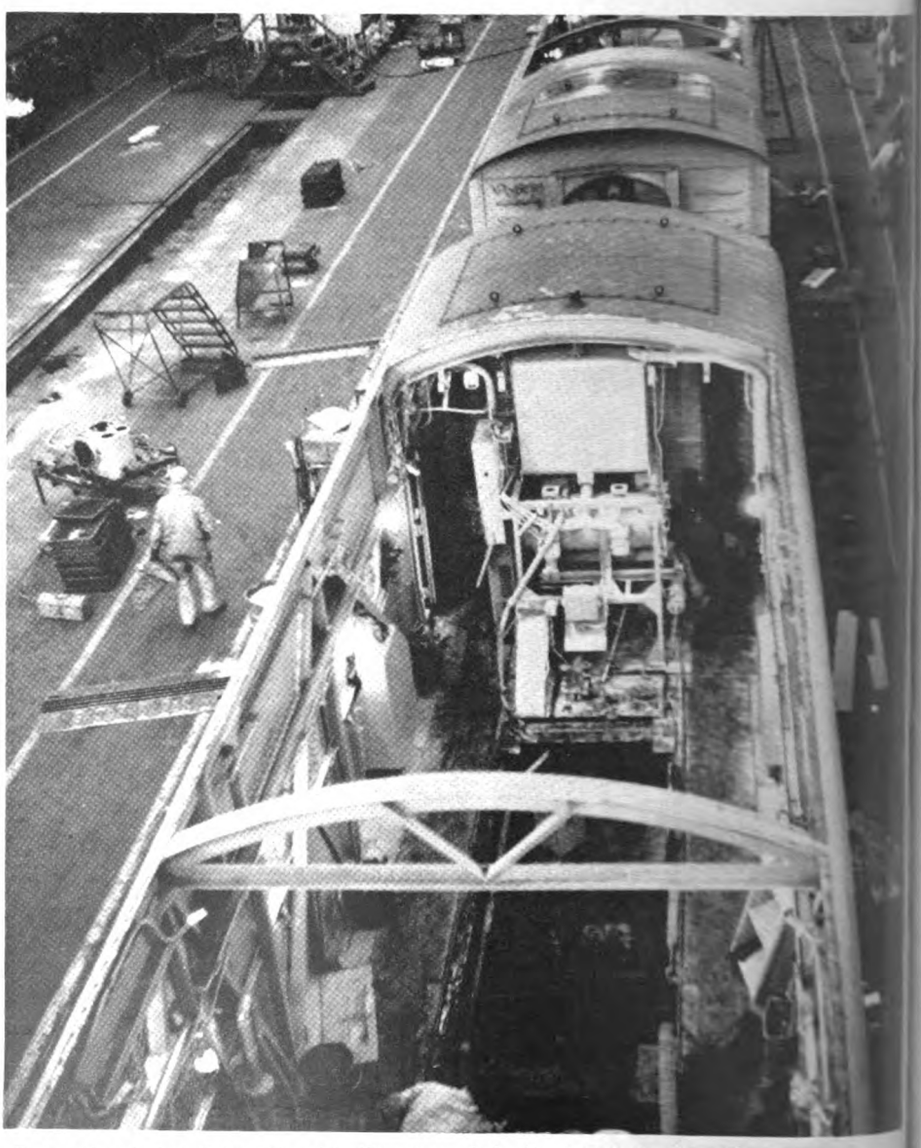
1. In the morning, overhauled generators and auxiliary generators are installed in carbodies (these are "swing" units).
2. In the afternoon, diesel engines are washed, given first coat of paint, and installed in carbodies.
3. Painters apply final coats to outsides of all units.

Fourth Day

1. Engines are aligned with generators and auxiliary generators.
2. Traction motor blowers, hatches, and cooling fans are reapplied.
3. Control air tests and hi-pot tests are made.
4. Engine is checked for leaks.
5. Oil and water are supplied to diesel engines.
6. Painters finish by painting trim, and stenciling.

Fifth Day

1. Diesel engines must be running by 8 am.
2. Locomotive is moved outside and engines are loaded, using the dynamic brake grids. Brake warning relays are set. Engine is run under load for 2 to 2½ hours.
3. Engine is completely checked, tightened, and electrical equipment checked.
4. Locomotive is released to transportation department about 3:30 pm.



Two road units have been stripped in the course of the five-day overhaul described above.

(*Continued from Page 38*)

igton. In addition to the wheel machine at Lincoln wheel lathes yde and 14th Street, Chicago are for some work on units operating f those terminals.

le life on freight units is limited to illion miles, and on passenger loco- es to 1.5 million miles. There is bitrary limit set on the axles of ning locomotives. Minimum rim ness allowed for wheels under nger units is 1⅜ in. freight units in. and 1-in. for switchers. Wheel facilities have not been concen- l at one point because of the re- ing steam locomotives. This power until the present, served to pro- peak traffic. Although heavy ma- equipment for these locomotives tained at West Burlington shop, no steam power has been repaired there in over five years.

New Procedures

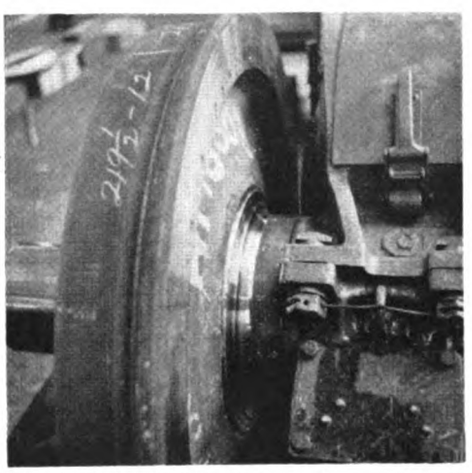
Labor and cost-saving devices are numerous in all departments at West Burlington. A tray holding diesel locomotive valves has been developed to facilitate cleaning in the Magnus cleaning tank. It consists of five circular shelves each holding 32 valves. An overhead crane places this tray and the valves in a cleaning solution. After 1.5 hours in the solution the valves are sent on for Zyglo inspection, buffing and grinding.

Original specifications for the early diesel passenger locomotives included the application of stainless steel carbody side panels. This practice discontinued during the war, was resumed over the last ten years. The life of ordinary carbady panel has been found to be from six to nine years but the stainless panels installed on units built in the late 1930's are still in excellent condition. Lacquer aluminum paint is used on the carbody exteriors of units not equipped with the stainless steel panels. Recently the Burlington has been testing the possible extension of the repainting interval for its freight units from two to three years. This will be carefully studied because good appearance and tip-top mechanical condition are goals of the Burlington's shopping programs.

PERIODIC OVERHAUL
IESEL LOCOMOTIVE COMPONENTS

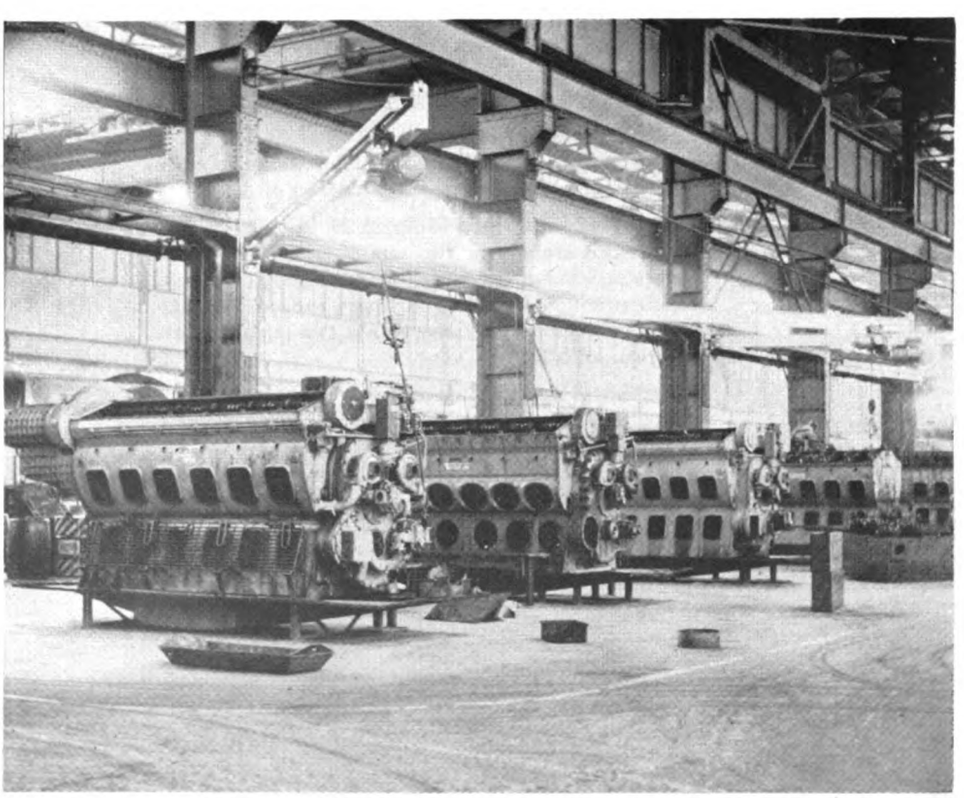
PROGRAMMED INTERVAL - YEARS

ain Bearing Renewal:	
EMD Passenger, 12-Cyl Engines	6
EMD FT, F2, F3 and F7	4
EMD SD and GP Units	6
EMD Switcher, 567 Engines	10
Baldwin Switchers	4
Alco Switchers	5
ir Compressors:	
Passenger	4
Freight	6
SD and GP Units	3
Switchers	10
Main Generators:	
Passenger	6
Freight	6
SD and GP Units	6
Switchers	10
Auxiliary Generators:	
Passenger	4
Freight	4
SD and GP Units	6
Switchers	10
Fuel Pump Motor - All EMD Units	6
Radiator Cooling Fan Motors	6
Traction Motor Blower Motors	6
Dynamic Brake Blower Motors	6
Electro-Pneu Governor Control	2
Oil Coolers (Clean, renew gaskets):	
Passenger, Freight, Switchers	2
SD and GP Units	6
Set Injector Timing, Lash Adjustors, Racks, Engine Speeds, Pilot Valves and Overspeed Trip	1/2
Callibrate Suction, Temperature, Pressure and Shutter Switches	1
Tighten Nuts, Bolts and Cap Screws: Air Box to Oil Pan, Engine Base, Accesory End, Blower End, and Head Frame Cover and Exhaust Manifold	1/2
Mars Light Dynamotor	2
Mars Light Mechanism	2
Headlight Dynamotor	2
Drinking Water Cooler Motor	2
Speed Rrcorder and Drive	2
Cab Heater Motors	6
Defroster Motors	6



Shop-made black iron dust guards are used on diesel axles.

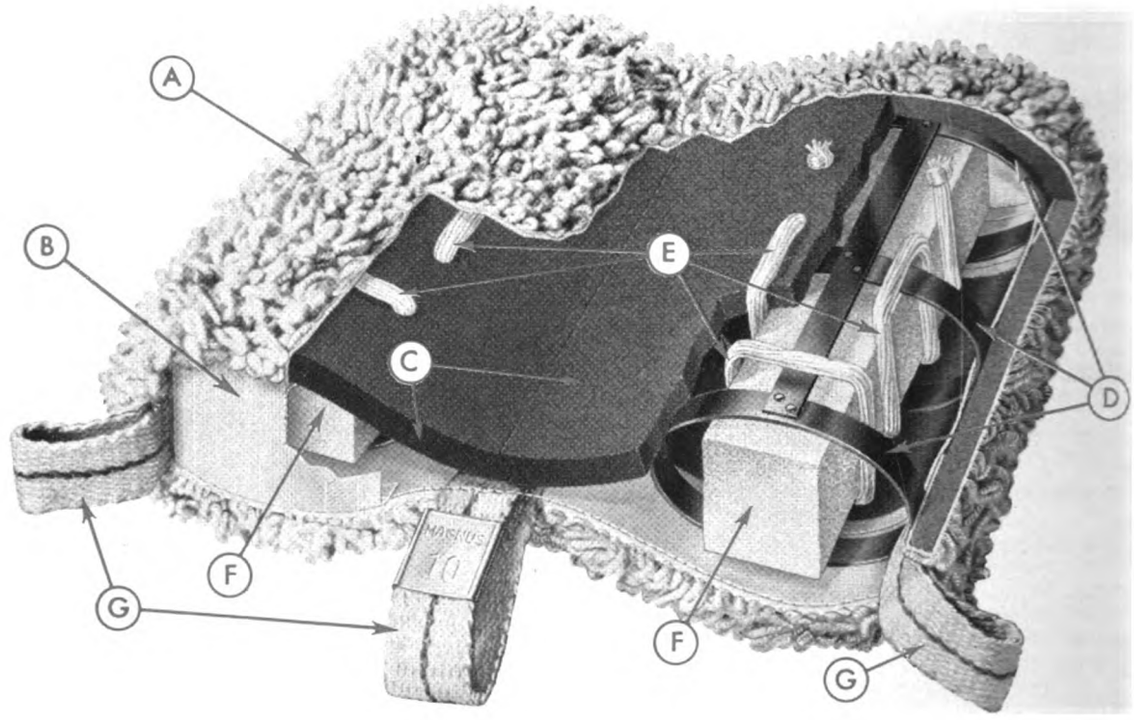
Circular rack is used for cleaning diesel valves in solvent tank.



Engines are removed from carbodies for the power assembly replacement. This work is done in two days.

NOW—A CAR JOURNAL LUBRICATOR DESIGNED AN

IT'S THE NEW MAGNUS



FEATURES and ADVANTAGES

(A) **Outer Cover** of tufted premium quality cotton yarn with heavy duck backing provides an ideal application and absorption surface which is glaze-resistant. It is washed and shrunk prior to assembly, assuring proper fit, and is stitched at both ends to prevent raveling and bunching in service.

(B) **End Covers** of cotton bolting cloth web assure lasting strength and flexibility—keep dust and dirt out of the internal wicking materials—restrict oil loss.

(C) **One-Piece Felt Pad** backs up the tufted cover and is formed around the two sets of steel springs and sewn together on the center line to make a single pad, with twin-lobe design—a far more rugged construction with better capillarity than if two separate pads were sewn together.

(D) **Flat Steel Springs**—three firmly connected springs in each lobe maintain constant and correct pressure on the journal. Scaleless tempered spring steel will not sag and allow the pad to fall away from the journal. The springs are firmly secured to the underside of the felt and cover and are riveted to spring steel spacer strips—a construction that positively prevents misalignment or contact of springs with the journal.

(E) **Internal Wicks** of 25-ply Bostonia provide 16 supplementary oil paths from the bottom to the top of each Magnus Lubricator Pad. Thus the design includes a combination of circumferential wicking, internal wicking and center feed wicking, assuring ample oil flow under all conditions.

(F) **Polyurethane Cores**—used solely to increase oil reservoir capacity—make for greater margin of safety in event of oil starvation by contacting the 16 internal wicks.

(G) **Extra-Strong Loop Handles** extend through pad centers, will withstand a pull of 300 pounds before failing. Additional loop handles are provided at each of the four corners. Brass nameplate on center loop carries the size identification. Magnus Pads are currently available in standard sizes for 5 x 9, 5½ x 10 and 6 x 11 car journals.

MAGNUS Solid Bearings

MAGNUS METAL CORPORATIO

LT BY JOURNAL BEARING EXPERTS

UBRICATOR PAD

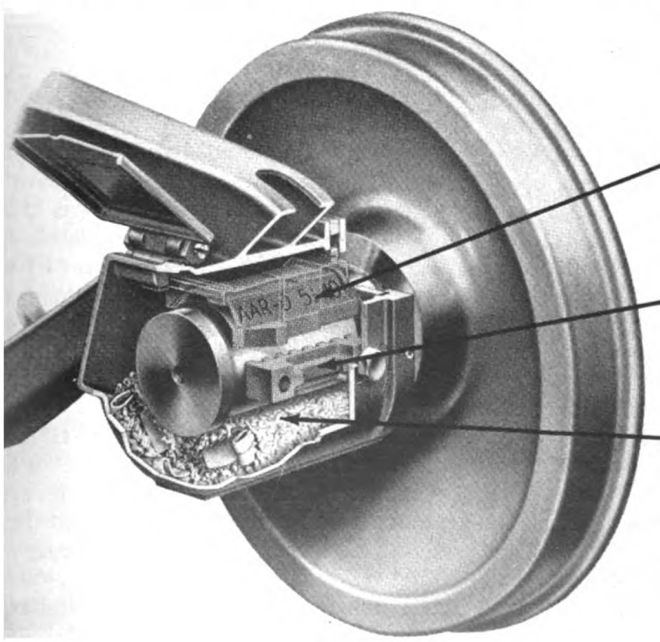
vay wicking, large oil capacity, rugged one-piece twin-lobe ıstruction are features of the MAGNUS journal lubricator t's now approved by AAR for interchange test installations

AT YOU need in a lubricator you get in the Magnus Pad. First, there's maximum wicking rcumferential, internal, and center feed — to ide cooler operation and a far greater margin afety in event of oil contamination. Internal s are *not entrapped* — wick more oil and are ily cleaned through normal reclamation process.

ıen there's high oil-retention capacity — fully ated, each Magnus Pad will hold more than times it's own weight in oil — better than 5.9 s for the 6" x 11" size.

he cover is heavy pre-shrunk duck tufted with ıium quality cotton yarn (proved the most prac- design) and backed with high capillarity felt. It's positively held against the journal at all times by elliptical tempered steel springs that eliminate sponge-type uplift media. The springs are firmly secured to both felt and cover. The whole is a unique one-piece twin-lobe reversible design, self-centering on the journal — end-enclosed to restrain loss of oil. It's a lubricator pad designed by bearing experts to give railroads the performance needed.

Get the full story on the NEW MAGNUS LUBRICATOR PAD. We will gladly send you complete information and answer any detailed questions you may have regarding its construction and operating characteristics. Write to Magnus Metal Corporation; 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4, Illinois.



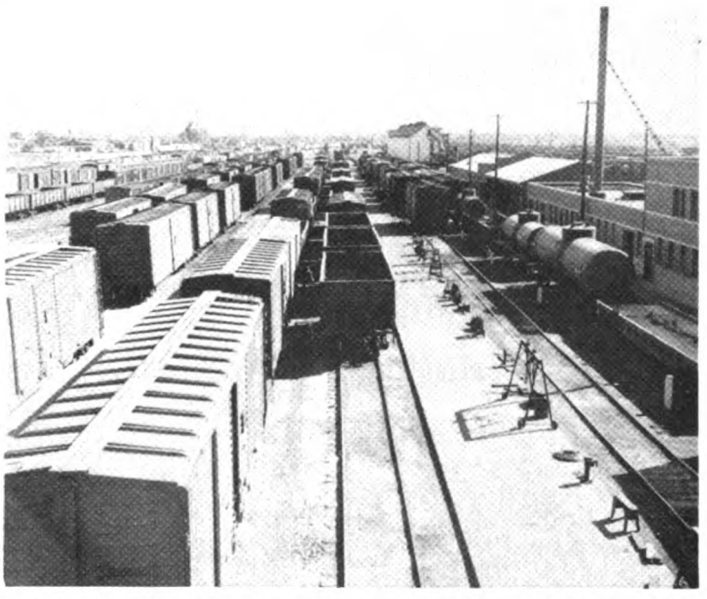
For Tops in Bearing Performance at Lowest Possible Cost

Magnus Solid Bearings—Are easy to maintain or replace. They can take the maximum load, make the fastest schedule. They save excess weight and have the lowest possible running resistance in pounds per ton.

Magnus R-S Journal Stops—Positively prevent excessive axle displacement during impact, braking, switching and humping. The result is better bearing performance with far lower maintenance, doubled bearing life, and reduced wheel flange wear.

Magnus Lubricator Pads—Provide a constant and uniform oil film for solid journal bearings. Three-way wicking, large oil reservoir capacity, rugged one-piece twin-lobe construction—these are three of the features that make Magnus Pads your best bet for efficient pad journal lubrication.

idiary of **NATIONAL LEAD COMPANY**



Light repair tracks for freight cars on the Burlington are characterized by their neatness. This installation at Lincoln has paved platforms between the tracks.

Maximum availability is assured for Burlington streamliners by arrangement and facilities of coach yards. Busiest point on the railroad is the 14th Street Yard, Chicago.

'Q' Keeps Its Cars on the Move

Repair and servicing facilities make possible the intensive use to which the Burlington puts its freight and passenger equipment

THE FOUR LARGEST light repair tracks on the Burlington are at Cicero (near Chicago), Galesburg, Kansas City, and Lincoln. All have one common feature —concrete platforms between the tracks. Cleanliness and orderliness are emphasized. Work equipment, painted a distinctive yellow, is kept neatly arranged along the tracks. Some facilities have speaker systems. Most material handling is mechanized. Several repair tracks have lathes for reworking cut journals, and some have brass boring machines. Fire protection equipment includes hose houses with reels and carts, and hand extinguishers. Snow brooms are available for winter use.

In addition to light and running repairs, some heavy repair programs are scheduled at the major light repair tracks. These include heavy repair programs for steel box cars and flat cars. At other times programs include repair and repainting for covered and open-top hoppers. Work involving more than 20 man hours per car is classified as a "heavy" repair.

A special feature of the Galesburg rip is a stub cleaning track adjacent to the west classification yard. It has a capacity of 45 to 47 cars and has been in operation for about a year. A novel method for carding cars for the cleaning track is used. Standard bad order cards are applied vertically to cars by inspectors in the receiving yard. When these cars go over the hump, the hump operator can instantly spot the vertical cards and routes all cars so designated to the cleaning track. A hot water Upgrader cleaner is used on about 15 to 20 cars per day. This takes about 15 min per car. The cleaning track is equipped with a 2-in. water line and a 1¼-in. air line. Hydrant cocks are located every 100 ft. After cleaning, cars are inspected and carded for commodities. The inspection includes a check of piston travel, application and release brake test, and inspection of safety appliances.

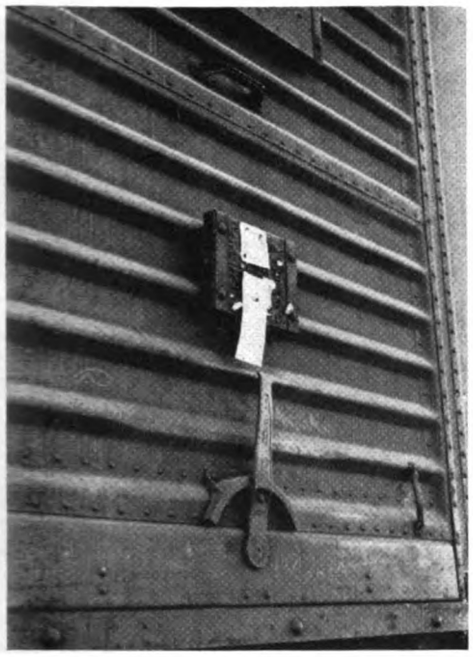
Burlington Route Special Report

One card is used by inspectors in classifying cars, both in classification yards and rip tracks. The card is 3½ in. square and has four classifications on each side. The Burlington uses five general classifications which grade cars from top quality downward: Sugar, Flour, Grain, Merchandise, and Rough Freight. A blank space is on the card for any other merchandise.

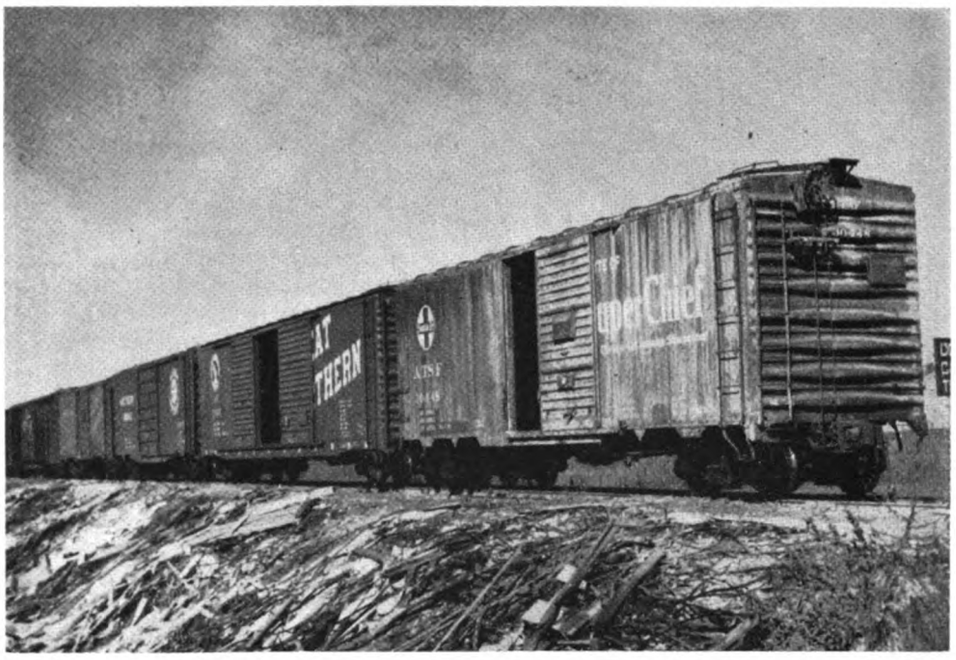
The mounting and turning of freight car wheels and axles is handled at five points on the railroad. The average numbers of wheel sets handled per month at these points are Galesburg—834; Havelock—772; Lincoln—660 and Alliance, Neb.—282. Galesburg and Havelock handle some solid bearing passenger car wheels. In addition Havelock turns passenger car and locomotive wheels. Truing of diesel locomotive wheels is done at Lincoln.

All diesel locomotive wheels and axles are done at West Burlington. Solid

(*Continued on Page 4*



Vertical bad-order card on the placard board tells hump operator at Galesburg that the car should be switched to the cleaning track.



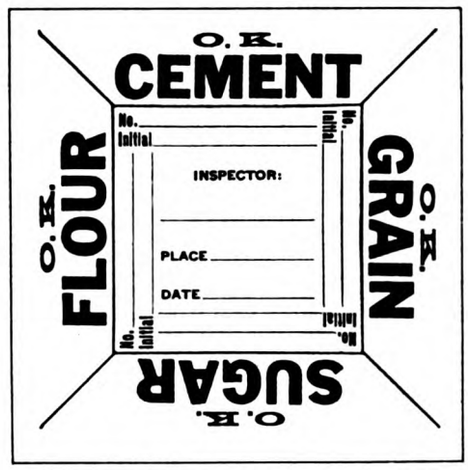
Cars on cleaning track at Galesburg are inspected and classified. Small repairs may then be made without switching them to rip track. Track is equipped for washing and cleaning. Cars are then classified for the highest commodity group which their condition will permit.

OUTPUT OF SHOPS AND REPAIR TRACKS
Monthly Average

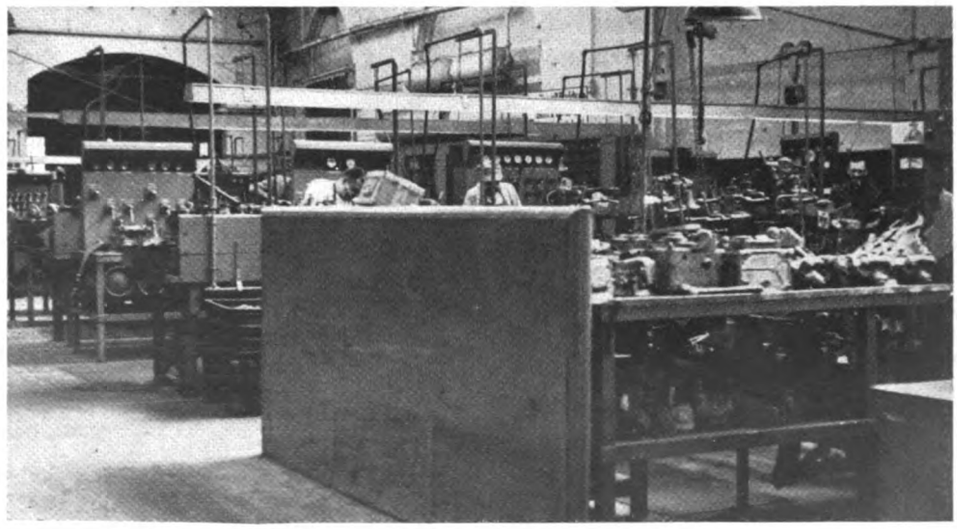
	LIGHT REPAIRS	HEAVY REPAIRS
FREIGHT CARS		
Alliance	1200	--
Burlington	176	--
Casper	462	--
Centralia	2452	--
Cicero	1430	--
Council Bluffs	264	--
Creston	150	--
Denver	800	--
Eola	616	--
Gibson	1100	8
Galesburg	2200	45
Guernsey	600	--
Hannibal	350	--
Havelock *	25	95
Lincoln	2640	60
McCook	330	--
Murray	2500	44
Ottumwa	150	--
E. St. Louis	375	--
N. St. Louis	528	--
St. Joseph	530	--
Daytons Bluff	1000	--
Savanna	200	--
Sheridan	500	--
PASSENGER CARS		
Aurora	7	5

* - Havelock Shop has been building new cars at an average rate of 141 units per month.

Hot water for washing car interiors is supplied by this Upgrader jet steam cleaner.



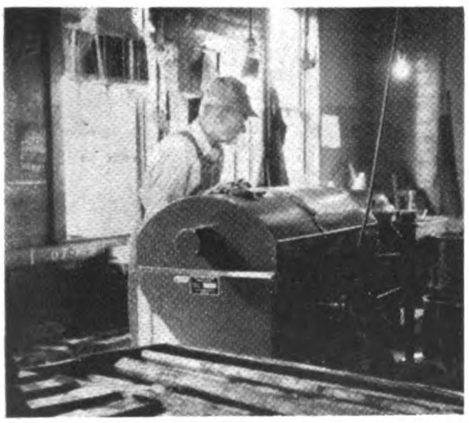
Card is applied by inspectors in classification yards to grade cars from top quality downward.



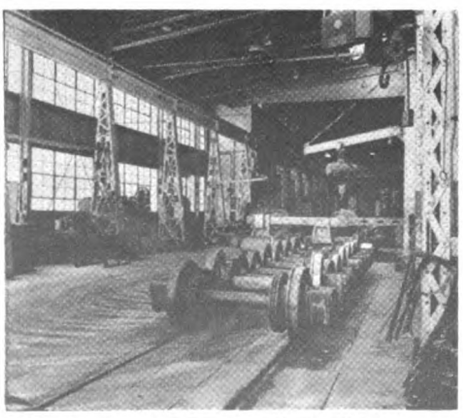
Approximately 33,000 pieces of brake equipment are turned out annually by Aurora brake shop. All passenger brake portions and about half of freight-car e quipment are processed here.

Drop pit at 14th Street, Chicago. Zephyr servicing must be high-speed operation.

Wheel storage tracks at Lincoln, one of four points at which wheels are mounted and turned.



Rip tracks at a number of points have been equipped with these Ajax brass boring units.



Roller-bearing passenger-car wheel and axle assemblies are handled at Aurora shop.

bearing passenger car wheels are turned at this point for Galesburg. All roller bearing passenger car wheels and axles are handled at Aurora Shop. Clyde (Cicero) turns freight and switch engine wheels. Chicago, 14th Street, turns passenger car and passenger locomotive wheels.

Burlington mechanical people from top officers to car inspectors and oilers, are well aware of the consequences of hot boxes. A continuing program is carried on to eliminate the conditions that cause hot boxes. Lubricator pad applications are being made at a rate of 962 car sets per month on company cars, excluding cars in series that are being periodically retired. By December 1, 1958, about 35 per cent of Burlington-owned cars were pad-equipped. Several types of pads are being applied in the program and other types are being tested.

Cars passing over the hump at Galesburg and Lincoln for classification have already had their trucks inspected. In the receiving yard a thorough examination of the boxes is made, packing is adjusted, and lids are left open. At the hump, oilers on both sides apply oil to each box as car passes by. The boxes again are examined after the train is made up. The lids are then closed. At Denver, oiling is done as trains move out of the yard. Two men on each side apply oil and close the box lids. Drums of oil, car brasses, lids, and other car materials are stocked at intervals along the tracks in most yards.

Aurora shop is not only the primary maintenance and repair center for passenger cars on the Burlington but it also manufactures many parts for diesel locomotives and freight cars. Among the sections which do repairs on a system basis, is the Air Brake Department. All brake equipment for the Burlington's passenger cars and passenger diesels is dismantled, repaired and tested. About 50 per cent of the yard switcher and switcher equipment is processed, along with 60 per cent of the freight car brake portions. Some 33000 pieces represent a year's output, and this will include all air and steam gauges for the railroad.

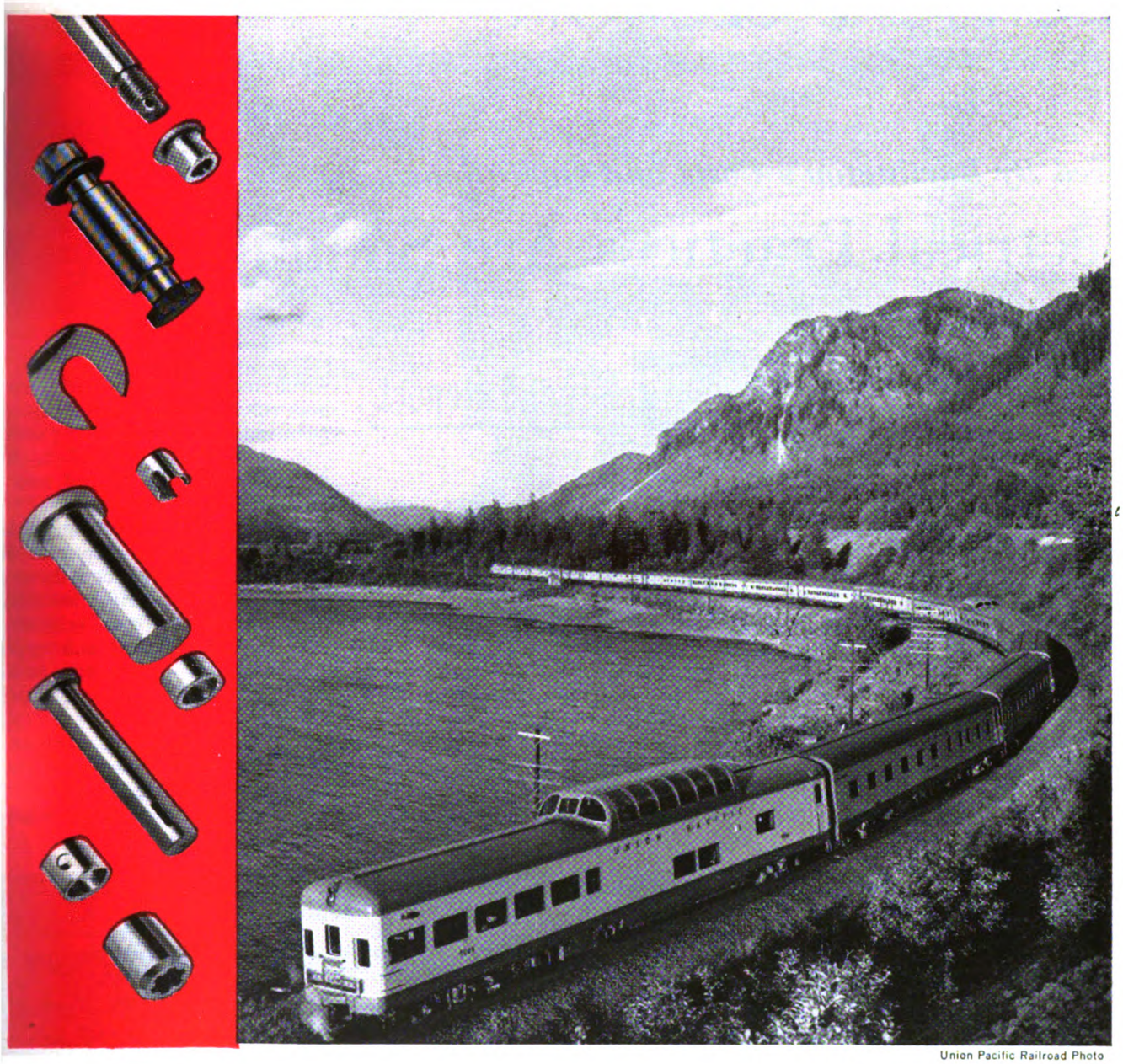
Eola Scrap Yard and Reclamation Plant, under direct supervision of the Superintendent of Scrap and Reclamation dismantles about 400 cars annually in addition to sorting and preparing scrap for sale. Among the many car parts that were either reclaimed or manufactured during a recent year were 27,000 air brake hoses, 5,500 signal hoses, 8,900 brake beams, 2,600 journal boxes, 1,000 truck side frames, 500 bolsters, 800 couplers and 8,100 angle cocks.

Movable A frame is used at Galesburg rip track for the disassembly of Unit trucks.

Portable device used at one rip track for straightening bulged freight-car ends.

Air-operated device simplifies straightening of box-car doors at the Lincoln rip track.

Silk screen process is used at Eola to produce colorful Burlington emblems.



Union Pacific Railroad Photo

Ex-Cell-O Pins and Bushings take high speed torture out of a million turns

Imagine the stress and strain on the pins and bushings as these passenger cars roar around this curve in the Columbia River Gorge. Ex-Cell-O Pins and Bushings—performing for over 200 railroads—take this kind of treatment every day. Often are usable up to a million miles because of a super-fine finish. Electronically controlled heat treating assures a deep, diamond-hard steel case. Dust, strain, abrasion, weather, sudden jolts—Ex-Cell-O Pins and Bushings shrug them off over the miles.

Because of well-stocked warehouses, you get express-quick service. Railroad men like the exceptional service policy that backs up every Ex-Cell-O Pin and Bushing. Available as assemblies or separately.

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ELECTRICAL SECTION

Proved By Burlington's Costs and Operations...

Electrical Practices Are Sound

Burlington Route **Special Report**

TODAY'S LOCOMOTIVE electrical maintenance and servicing policies on the Burlington have evolved through almost 25 years during which the road has operated diesel electrics. Even this was preceded by extensive operations of gas-electric rail cars. In addition, the comfort and reliability of one of the nation's finest main-line and suburban passenger operations are assured by practices developed for handling modern coach electrical equipment.

West Burlington shop is now tooled to repair all the traction equipment on 683 diesel units and 15 rail cars. The electrical section of the West Burlington Ia. shop is divided into eight departments located across from each other along the aisle at the center of the diesel bay. The road does almost all of its own electrical overhaul work and the diversity of these departments indicates the scope of these operations. The departments are:

1. Armature winding department which handles traction motors, main generators, auxiliary generators, traction motor blower motors, cooling fan motors and similar equipment;

2. Control and small equipment repair department which works all contactors and relays;

3. Electrical machine department which balances all rotating equipment both statically and dynamically. Equipment includes two balancing machines, one 16-in. lathe, one 48-in. lathe, a 400-ton vertical press; and two armature banding machines;

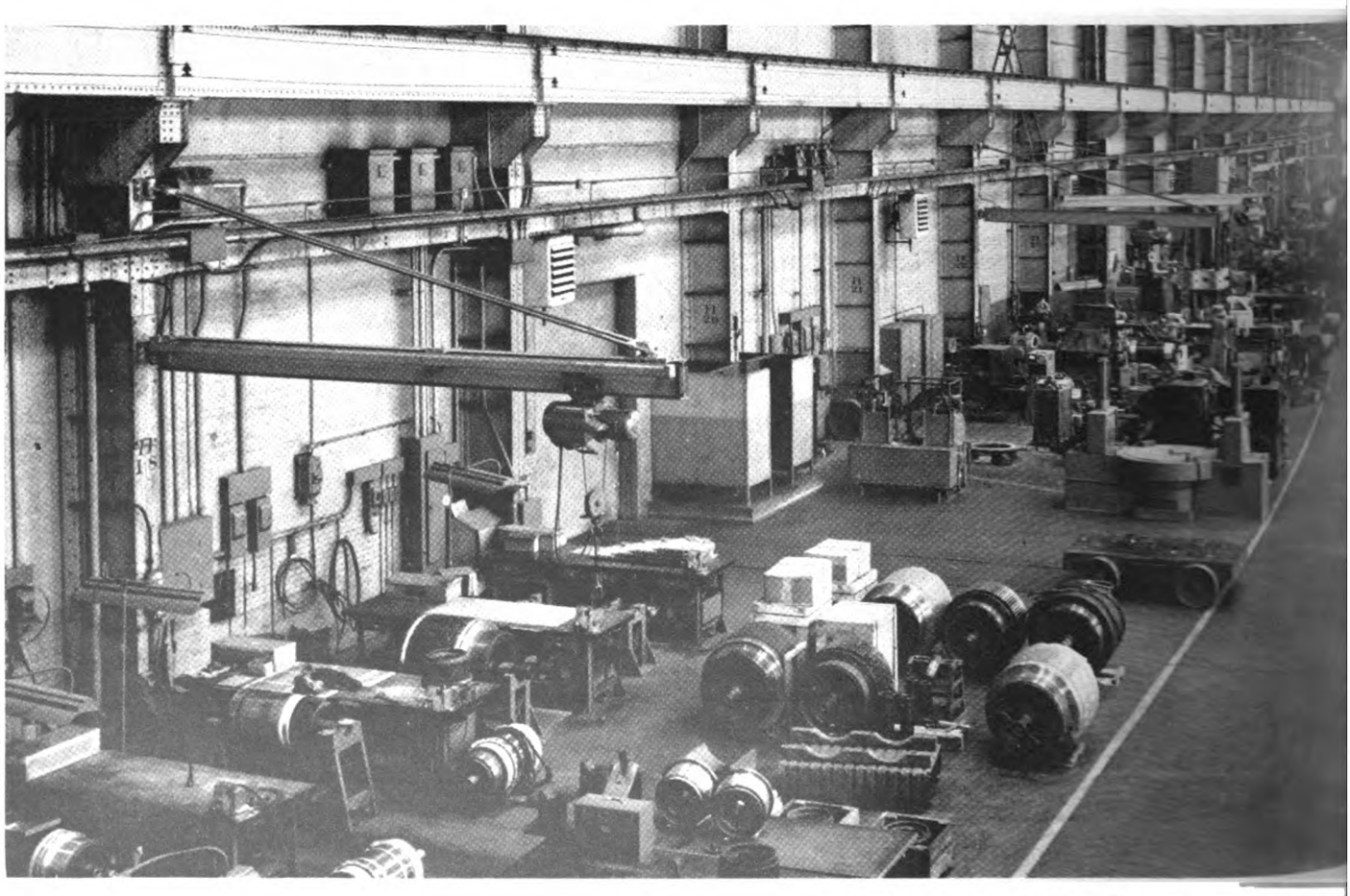
4. Varnishing and baking department where the equipment consists of impregnating equipment and three ovens;

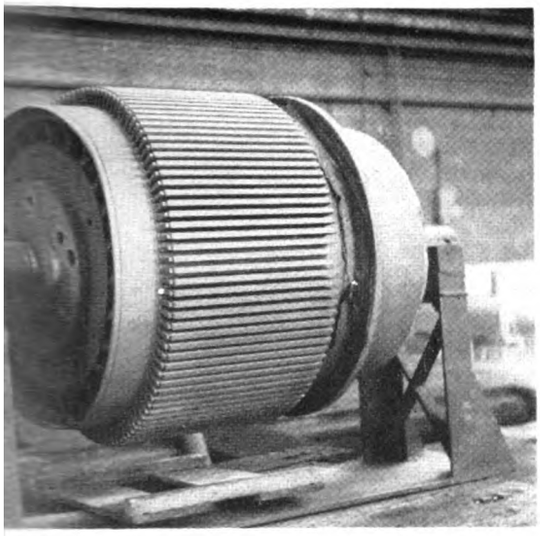
5. Armature bearing assembly department where these critical roller bearings are inspected and applied;

6. Cleaning department which is equipped with a cleaning booth and a degreaser;

7. Traction motor department where motors are stripped, inspected, repaired, assembled and tested;

8. Generator department where ge-

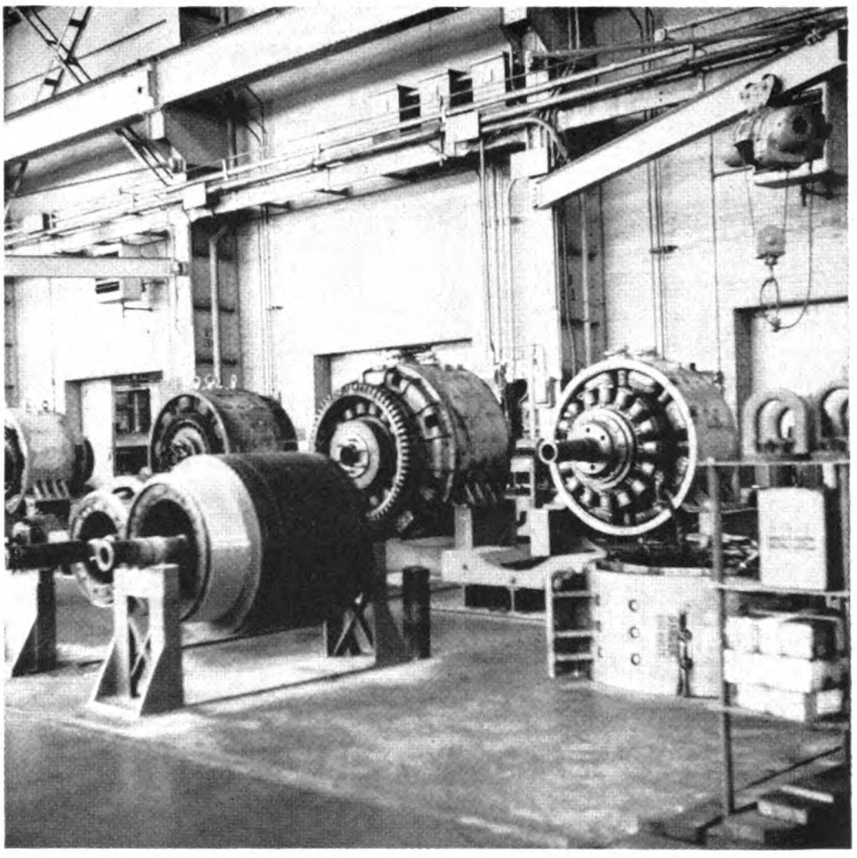




Main generator armature cores are now cleaned of fly ash from power house.

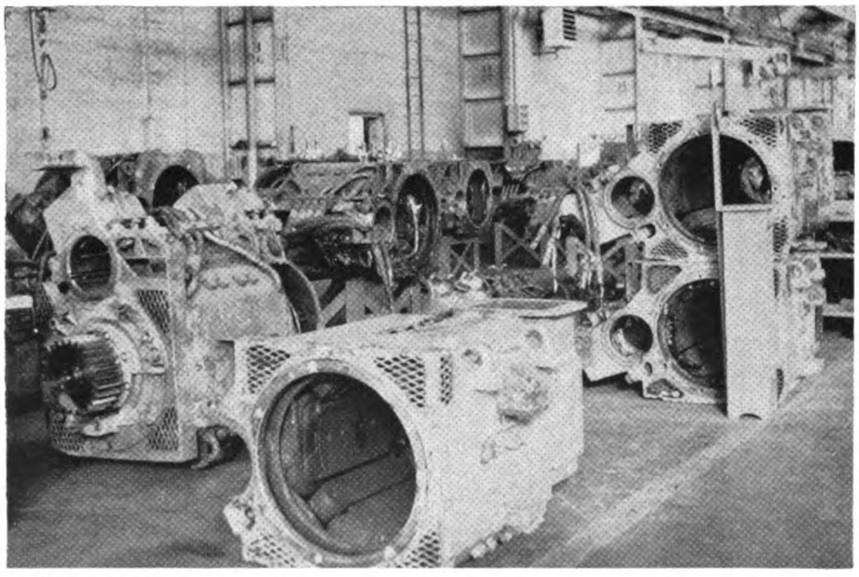
ıtors are processed in the same way ıt traction motors are handled.

Main generators on freight and pasıger units are removed and cleaned specified intervals. At the six-year erhauls the generators are recondined and new bearings are applied. action motors are repaired on the lowing basis: 400,000 miles for pasıger units, 500,000 miles for freight its, and 10 years for switching locootives (in conjunction with general erhaul). Typical daily output at West ırlington is usually five motors.



Main generator frames stand on special stands for completion of assembly.

The electrical section of West Burlington Shop is composed of eight special departments which process most of the electrical components of the railroad's diesel locomotive fleet. Rewinding and balancing are done at left foreground. At right is the section where small parts are reworked and back of that is the impregnating and baking equipment.



Burlington emphasizes cleanliness and this extends to traction motor exteriors which are color coded after rebuilding.

Stand elevates traction motor and holds it in vertical position to simplify installation of brush holders and the covers.

Experiments using epoxy materials for repairs to motors and connections have been proving satisfactory. The epoxy material is now used over all string bands on traction motor armatures. Limited tests are now under way on the use of Fibreglas tape to take the place of the original steel banding on armatures. A systematic program has seen grease eliminated from almost all traction motor armature bearings. They are now lubricated with oil.

Fly Ash Cleaning

Labor and cost-saving methods are characteristic of West Burlington shop. As an example armature cores of generators and traction motors are cleaned with fly ash from the shop power plant. Core slots are initially cleaned by hand to remove some of the mica. This is followed by cleaning with the fly ash delivered through a standard air-operated sanding device. It takes about one hour to clean the core of a main generator and about 20 minutes for a traction motor core. When sand was used its peening action against the soft iron core restricted the openings so it was difficult to apply the coils.

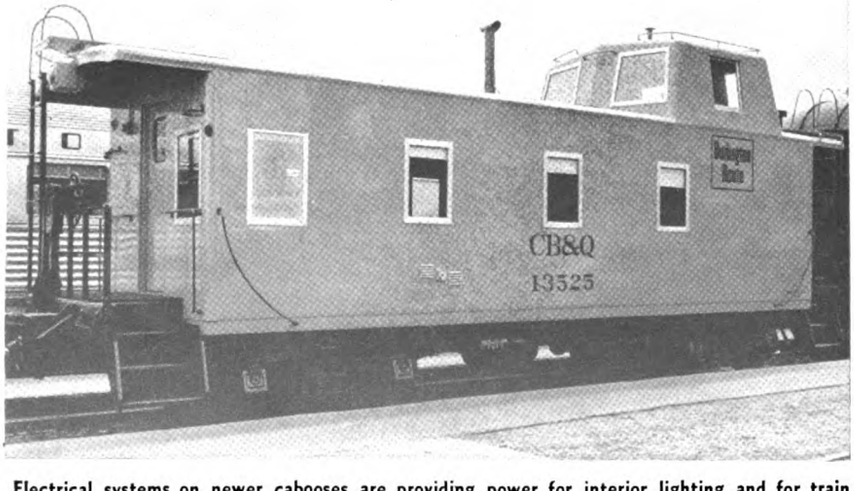
A stand in the electrical department makes it possible to stand the traction motor on end to simplify the application of brush holders and cover plates.

The Burlington has, in general, maintained the electrical and control equipment of its locomotives as it was originally built. Locomotives are rewired by inspection, and complete rewiring is not part of a scheduled program.

Car Maintenance

Locomotive and passenger car batteries are reworked at the coach shop at Aurora. Aurora handles the overhauling of motors and generators for all passenger cars. Genemotors are changed out each year on all high-mileage passenger equipment. The scheduled preventive maintenance is assigned at Chicago and Minneapolis. The Genemotors are then completely overhauled before going back under other cars. Industrial motors for the system are repaired and rewound at the Aurora and Havelock electrical shops.

Sixty cabooses are now equipped with axle generators. Older installations are 32-volt systems and the later cars have 12-volt generating equipment. Some other cabooses have 12-volt storage battery systems without generator. The 12-volt batteries are charged with portable battery chargers (110-volt a-c to 12 volt d-c). Charging of the 32-volt batteries on cabooses is done with engine-driven portable machines.



Electrical systems on newer cabooses are providing power for interior lighting and for train radio. Some cars have heavy-duty 12-volt batteries.

Preventive maintenance for some Genemotors is handled at 14th Street, Chicago.

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by Walter A. Lucas

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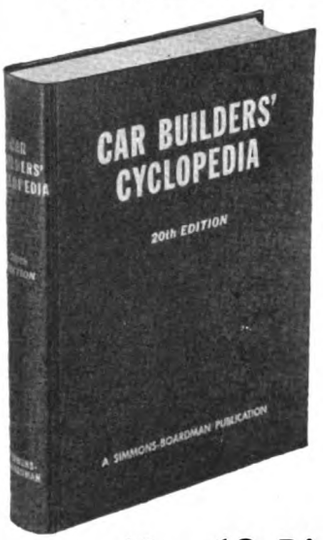

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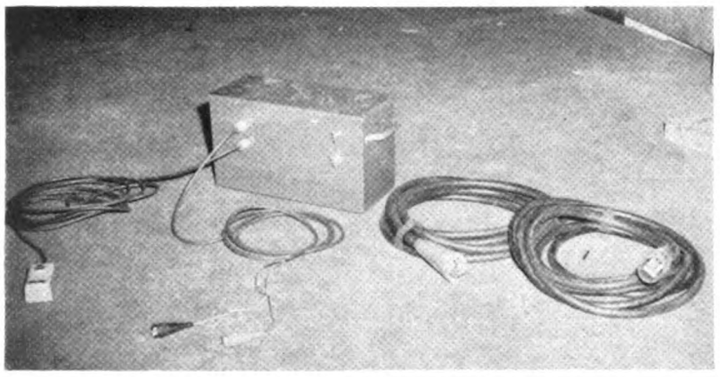
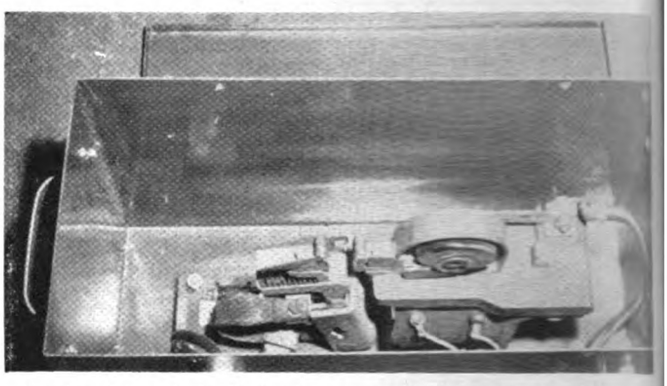


All the gear required to move locomotive by means of its own battery.



Interior of "magic box" showing power-closed, spring-opened contactor.

Moving Locomotives in the Shop

A SIMPLE ARRANGEMENT for moving locomotives in the shop or other places where it is undesirable or impossible to use the engine, has been developed in the Milwaukee, Wis. shops of the Chicago, Milwaukee, St. Paul and Pacific.

The complete equipment required, including the so-called "magic box", is shown in one of the illustrations. The locomotive is moved with its own battery and the equipment consists of two power cables, a box containing a starting contactor, a control cable which permits remote pushbutton closing of the circuit breaker and a light two-wire cable to bring power from the battery for operating the circuit breaker. Locomotive starting contacts such as the one in the box are normally opened by gravity, but this one is fitted with a spring which assures its opening with the box in any position when the pushbutton on the control cable is released.

For operation on FT locomotives, one of the power cables is secured to the negative or hot side of the locomotive starting contactor. The other lead is clipped to the stationary side of the S contactor. A ¾-in. brass nut is then placed between the contacts on the positive side of the starting contactor. The leads from the pushbutton coil are connected by clips across the positive and negative of the battery switch.

When the contactor in the box is energized by pressing the pushbutton, two motors in parallel are connected across the battery and the locomotive is moved slowly. On F-3 locomotives the positive cable is clipped to the movable side of the S14 contactor and on F-7's to the stationary side of S23. The method may be used on all of the various types of locomotives.

Care must be taken to have air pressure for braking on the locomotive when it is moved or, if necessary, the hand brake may be used.

With such equipment available, the use of tractors or switching locomotives is eliminated.

From the Diesel Maintainer's Note Book

Diesel With Mixed Up Cooling

B. A. Striver

A RECENT EXPERIENCE with an Alco road switcher illustrates how grounds on controls can tie in with one another with surprising results. This locomotive came in with a report that the engine water cooling fan continued to run even though the engine temperature was low. An examination of the fan control panel indicated that fan relays were open. A test for ground showed that the eddy current clutch coil was grounded, but with a single ground there should not have been a circuit to run the fan. There was no visible defect that could be cleared.

A check on the control circuits showed another ground and this was found to be in the auxiliary circuit *51A* wire, which feeds the drinking water cooler motor, the cab heater motor and the gage lights. It is connected to the various circuits at a terminal strip located in throttle stand. By a process of elimination, it was found that the ground was in the drinking water cooler circuit.

The ground was caused by one wire being pinched between the back of the receptacle and the bushing on the end of the conduit. This conduit projected through the back of the box and was

rather long. New wire and a new receptacle cleared the ground, and the engine water cooling fan was again under the control of the fan control panel. The eddy current clutch coil was changed out later.

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

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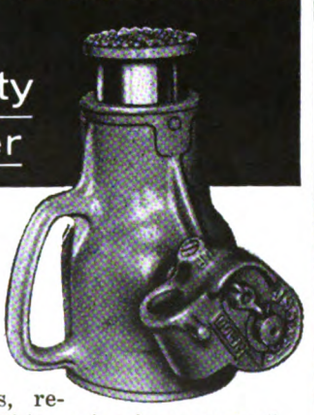

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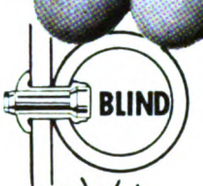

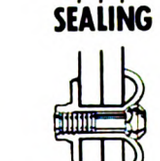

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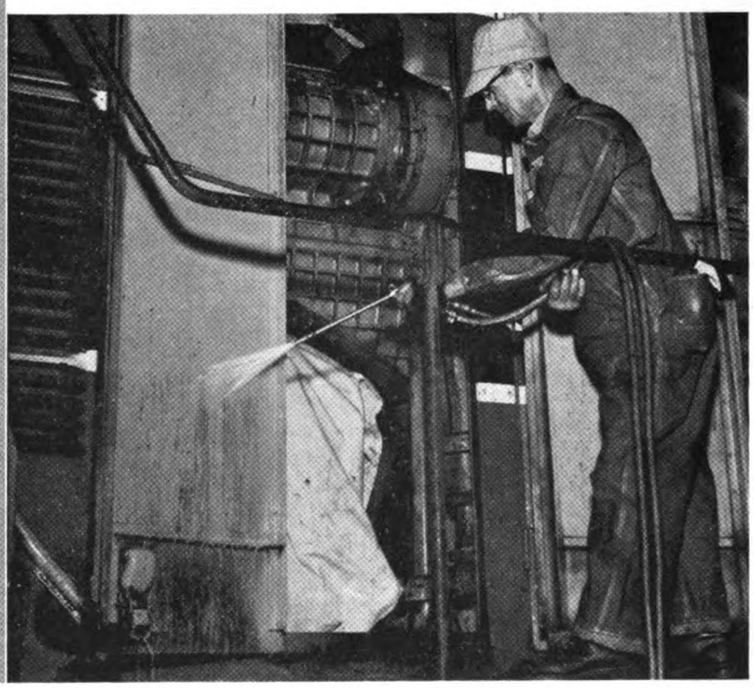

Spray this fast-acting emulsion-type cleaner on dirty, oily surfaces — painted or unpainted — such as locomotive bodies, engine blocks, accessories, valve covers, running gear, frames . . . and watch all dirt and oxidized grease or oil roll off quickly. No rubbing or brushing is necessary—Lix 22 does the cleaning job thoroughly. After spraying, just rinse with mineral spirits or water.

Lix 22 is the very cleaner a railroad needs when the part cleaned is to be **repainted.** It removes oxidized paints and leaves the surface in condition for painting.

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CORPORATION OF MISSOURI

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Personal Mention

Canadian National.—*Moncton, N.B.:* DAVID A. FOSTER appointed Maritime district superintendent of motive power and car equipment, succeeding W. H. BOULAY, retired. J. R. KEMP appointed mechanical engineer, Atlantic region, succeeding Mr. Foster. Mr. Kemp previously assistant mechanical engineer at Winnipeg, Man.

Central Vermont.—*St. Albans, Vt.:* DELBERT M. BRESSETTE, mechanical engineer, appointed superintendent of motive power and car equipment, succeeding C. H. LOCKHART, retired.

Chesapeake & Ohio.—*Richmond, Va.:* H. J. BAKER appointed general superintendent car department, succeeding E. C. ELLIS, retired. Jurisdiction of J. C. SMITH, general master mechanic, extended to include Hinton division. *Grand Rapids, Mich.:* H. M. VISE, JR., assistant superintendent car department, appointed superintendent car department, succeeding Mr. Baker.

Chicago, Milwaukee, St. Paul & Pacific.—*Milwaukee:* MARTIN WANGBERG appointed assistant superintendent air brakes. Formerly traveling engineer, Trans-Missouri Division.

Erie.—*Buffalo:* JESSE H. SMITH appointed general foreman, Buffalo Division. *Jersey City, N.J.:* GEORGE T. FLEMING appointed general foreman, N.Y. and Terminal divisions. *Port Jervis, N.Y.:* FRANK L. VAN SCHAICK appointed supervisor of locomotive operation. *Dunmore, Pa.:* FRED WILLIAMS appointed general foreman, Wyoming division. *Hornell, N.Y.:* JOHN E. BOWEN appointed division car foreman, Susquehanna division. *Meadville, Pa.:* CHARLES E. SCHUETTE appointed division car foreman, Allegheny, Meadville and Bradford divisions. *Marion, Ohio:* CHARLES M. STUBBS, assistant master mechanic, appointed master mechanic, succeeding HARRY I. PHELPS, retired.

Great Northern.—*Spokane, Wash.:* H. M. WHYTE appointed superintendent of motive power, succeeding R. A. SMITH, retired. E. N. ROBERSON, diesel supervisor, appointed traveling engineer, succeeding R. E. Johnson. *St. Paul, Minn.:* J. G. GERMAN appointed assistant to the chief mechanical officer, succeeding Mr. Whyte. *Seattle, Wash.:* T. W. MACKENROTH appointed master mechanic, succeeding Mr. German. *Great Falls, Mont.:* R. E. JOHNSON appointed master mechanic, succeeding Mr. Mackenroth.

H. M. WHYTE, now superintendent of motive power at Spokane, began GN career in 1926 as a laborer and machinist helper at Great Falls. He later became machine foreman; foreman wheel shop at St. Paul; shop superintendent at Superior, and in 1954 assistant to chief mechanical officer at St. Paul.

Illinois Central.—*Chicago:* ROLLIN J. CHINN appointed mechanical and shop engineer. *McComb, Miss.:* B. D. VENABLE, appointed master mechanic, succeeding Mr. Chinn. Mr. Venable formerly assistant master mechanic at Memphis, Tenn.

New York Central.—*New York:* W. J. ROHRER appointed manager equipment personnel, succeeding D. R. CRAFT, deceased. J. J. WARD appointed supervisor personnel-mechanical, succeeding Mr. Rohrer.

New York, New Haven & Hartford.—*New Haven, Conn.:* D. S. ONNEN, chief engineer, equipment, appointed director of research. A. T. PEAGAN, director, research and planning-operating, appointed assistant general manager-engineer. R. W. HOOPER, general mechanical superintendent, appointed general superintendent—car department. G. A. CLARKE, assistant general mechanical superintendent, appointed chief mechanical engineer. W. A. BAKER, general superintendent locomotive maintenance, appointed general superintendent—locomotive department. R. H. DAVIS, assistant director research and planning, appointed superintendent car department.

Seaboard Air Line.—*Richmond, Va.:* H. R. BOYETTE appointed mechanical engineer. Formerly diesel supervisor (system).

Southern Pacific.—*San Francisco:* GEORGE W. KAHLER, assistant electrical engineer, retired.

Supply Trade Notes

Douglas V. DeGeer

Lionel DeWaltoff

WYANDOTTE CHEMICALS CORPORATION, J. B. FORD DIVISION.—*Douglas V. DeGeer* appointed special representative, railroad sales department, covering sales and service to railroads in Minneapolis and Chicago.

■

OCTAGON PROCESS, INC.—A fully equipped "Industrial Technical Service" research and development laboratory, independent of main laboratory, formed at 15 Bank street, Staten Island, to aid in problems involving degreasing, phosphating, plating, rust prevention, paint stripping and production cleaning. *Lionel DeWaltoff* appointed technical director of this division.

■

K S M PRODUCTS, INC.—A new warehouse and sales office established at 656 Folsom street, San Francisco. *John T. Raynor,* former district sales engineer for Philadelphia, appointed regional sales manager,

Results for the CB&Q— AND YOU!

No. 3.—five electrode Cheston, for high production positions—the workhorse of the railroad car shops. Other models for heating two and three rivets at a time.

The Burlington has a full complement of Cheston Electric Rivet Heaters working in its car shops at Havelock. This outstanding customer, together with the scores of other railroads and car builders that we have served for many years, knows that the best results are achieved with the best equipment.

Economy, convenience, added efficiency, improved workmanship, better shop conditions, good housekeeping, and year after year of trouble-free service are built into the Cheston Rivet Heater . . . Total operating costs average 15¢ or less per 100 lbs. of rivets heated, a 75% reduction in rivet-heating expense in most shops . . . Production within seconds of starting up permits stepped-up working schedules and eliminates Waiting Time losses . . . There is no pre-heating expense, or fuel waste during idle periods . . . Rivets are heated as needed, rather than burned or coked by the shovel-full, and the electrically-heated rivet has no scale or diameter loss, and its superheated core allows clean, full, tight heading . . . No compressed air is required by the Cheston, so pressure formerly lost to blast-type heaters is added to the tools for faster, better work . . . Heat, smoke, grime and fire hazards are all eliminated . . . Operation of the Cheston is both simple and comfortable, and with the Removable Contact Blocks now standard for our equipment, new-heater performance is maintained year after year with no downtime and next to no expense.

These many advantages have made good sense to the Burlington, and to progressive railroads the world over.

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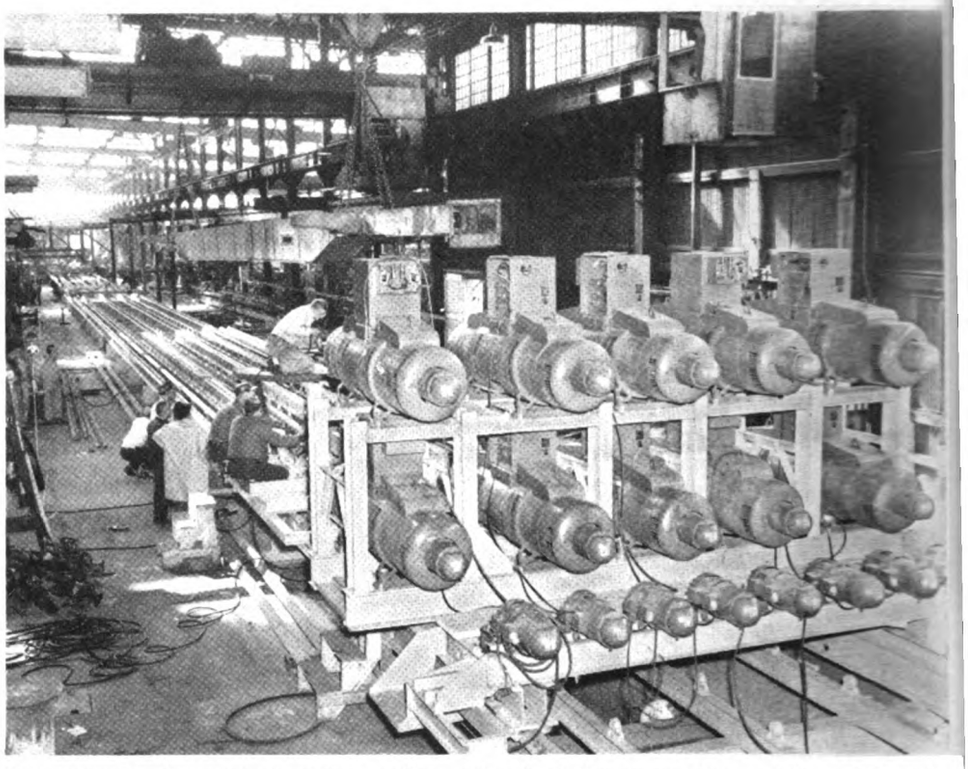
ELECTRIC MOTOR CLEANER



This automatic submerged arc-welding machine, said to be the largest ever developed for a single welding operation, was designed and built by the Pullman-Standard Car Manufacturing Company and installed at its Butler, Pa., freight-car plant for use in the mass production of 85-ft flat cars for piggyback service. The unit, with its extending jig 385 ft in length, employs 20 welding heads which simultaneously make 10 welds approximately 85 ft in length. It is being used in the construction of 462 flat cars ordered from Pullman-Standard by Trailer Train, the Union Pacific, and the North American Car Corporation. Twelve cars a day are in mass production.

Pacific area. Assisting Mr. Raynor is *F. G. Kern,* district sales engineer for San Francisco and Northern California. *F. Leonard Hultquist* appointed sales engineer at Los Angeles where a new office has been established at 1238 S. Atlantic Boulevard.

■

K W BATTERY COMPANY.—*Ralph M. McLean, Jr.,* Progress Railway Supplies, Inc., St. Louis, appointed K-W sales representative to railroads in St. Louis area.

■

STRAN-STEEL CORPORATION, DIVISION OF NATIONAL STEEL CORPORATION.—*C. V. Blackburn,* vice-president sales, appointed executive vice-president. *Julius G. Skaaren,* manager of building sales, appointed general sales manager.

■

ELECTRIC STORAGE BATTERY COMPANY, EXIDE INDUSTRIAL DIVISION.—Roland *Whitehurst,* vice-president, retired October 31.

Administrative, sales and accounting departments of Industrial division , formerly in Robinson building, Philadelphia, moved to Philadelphia plant at Rising Sun and Adams avenues. Corporate offices moved to 2 Penn Center Plaza.

■

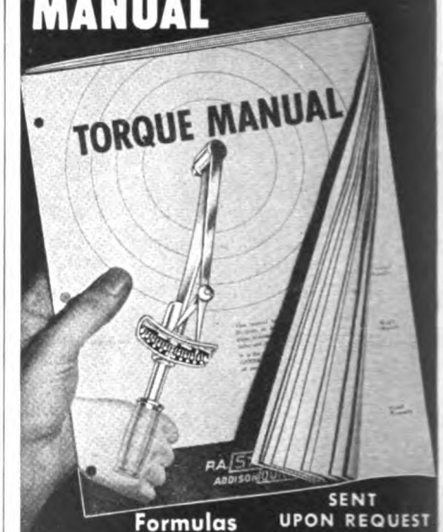
HUNT - SPILLER MANUFACTURING CORPORATION.—*J. E. Ostrowski,* railroad representative, appointed assistant sales manager at Boston.

■

BIRDSBORO STEEL FOUNDRY & MACHINE CO.—*Ralph Wilson Brown* and *Robert V. Simpson* appointed railway and in-

(*Continued on page 60*)

"TORQUE WRENCH" MANUAL



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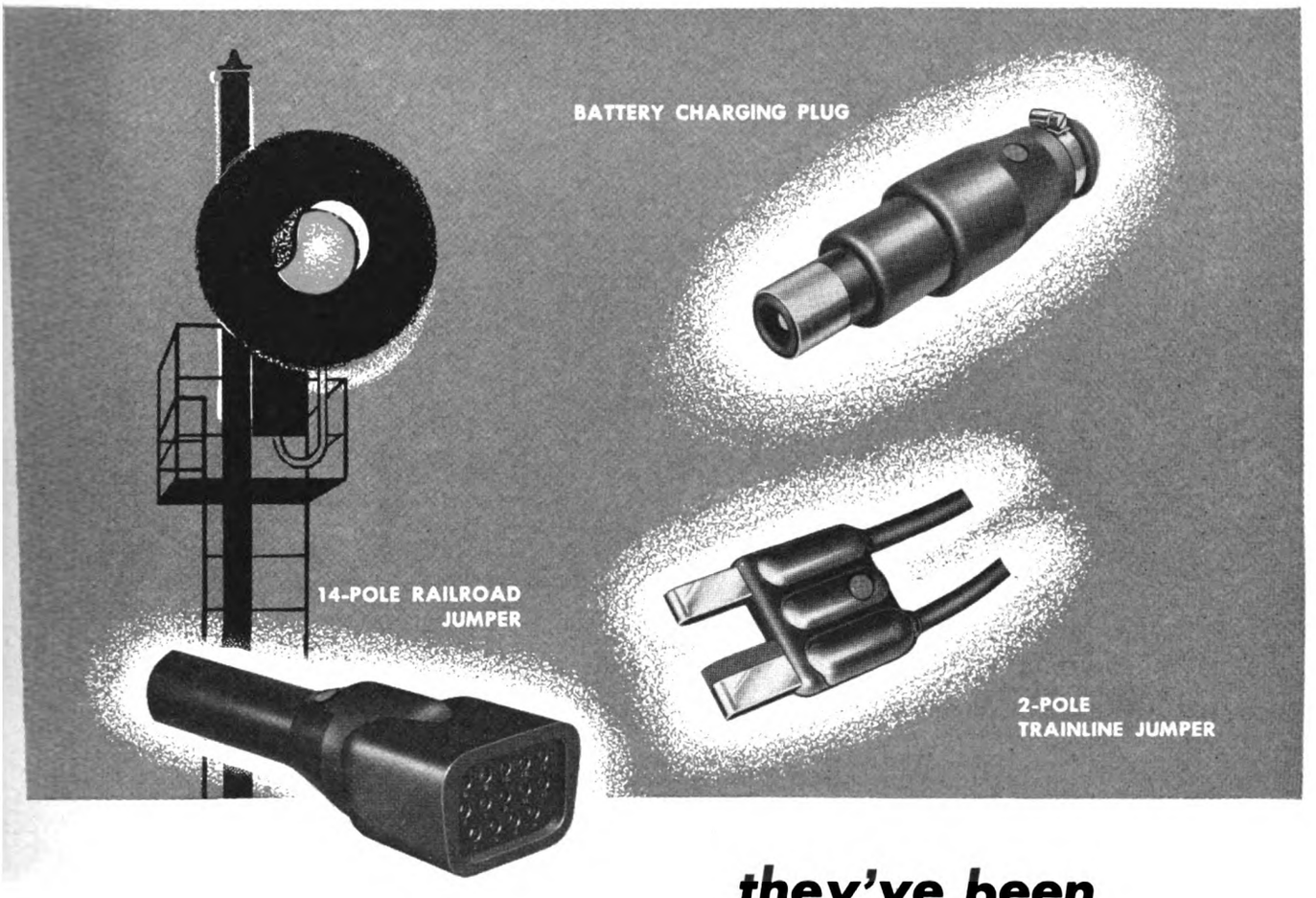

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Are they on *your* payroll now? They *should* be. You'll find them listed, with many other Connectors for Locomotive & Car Equipment, in the Joy Railroad Catalog B64 . . . yours for the asking.

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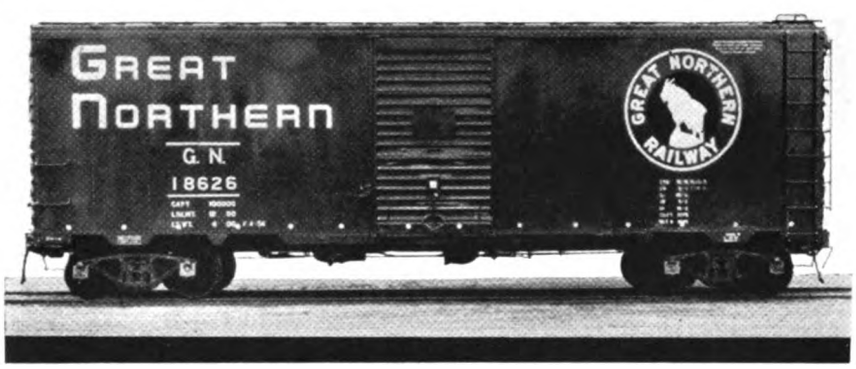
Plastinail*

Nailable Cement Flooring



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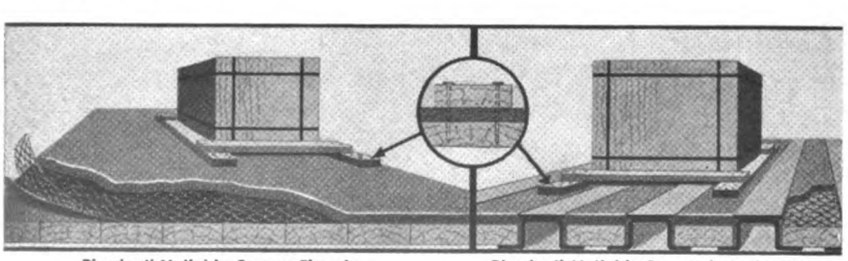
Do you have the Plastinail story? Applied to a sound B or C floor, it will provide 7 or 8 years or more of Class A service. And it's a better floor — smooth, inorganic, non-absorptive, easily prepared, nailable. Yet, Plastinail costs less than a new wood floor. The first cost is less. And the service is supreme because wood and Plastinail is 79% stronger than wood alone.



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Plastinail Nailable Cement in conjunction with steel as an original floor

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dustrial sales engineers—Mr. Brown in Baltimore, Philadelphia and the eastern United States; Mr. Simpson in Baltimore, Washington, and points south. Mr. Brown formerly with the Flannery Bolt Company; Mr. Simpson, with Hyatt Bearings Division, General Motors Corporation.

■

SCULLIN STEEL COMPANY.—*Thomas W. Pettus,* executive vice-president, named president.

■

GENERAL MOTORS DIESEL LIMITED.—*Andrew Younger* appointed district engineer at Winnipeg, Man., succeeding *G. Norman Bennett,* transferred to Toronto, Ont.

■

HUCK MANUFACTURING COMPANY.—*Ray V. Clute,* western division sales manager, appointed assistant to the vice-president—sales.

■

UNITED STATES RAILWAY EQUIPMENT COMPANY.—*Ralph M. McLean, Jr.,* Progress Railway Supplies, Inc., St. Louis, Mo., appointed sales representative to the railroads in St. Louis area.

■

WHITING CORPORATION—*Robert S. Hammond,* vice-president, Chicago, retired.

■

MAGNUS CHEMICAL COMPANY—*Dr. Robert J. Rohr* appointed director of research and development at 2155-57 West Hubbard street, Chicago.

■

VAN DER HORST CORPORATION OF AMERICA.—*Dr. Hyman Chessin* appointed director of research and development. *Lee Alderuccio* succeeds Dr. Chessin as assistant director of research and development.

■

TURCO PRODUCTS, INC.—Ground has been broken in Wilmington, Calif., for an administration building and executive wing, a research center, and an engineering service building. Scheduled for completion next summer.

■

EX-CELL-O CORPORATION.—*Frank W. Hughes* appointed Railroad Division representative in Philadelphia area, with offices at 987 Suburban Station Building.

■

A. M. BYERS COMPANY.—*James A. MacDonald* appointed representative in Toronto.

Obituary

J. V. CONWAY, western sales manager, Transportation Seating Division of Heywood-Wakefield Company, died October 6.

What's New

(*Continued from page 14*)

Single-Stage Regulators

The Airco 9900 Series of single-stage inverse type station regulators are designed for handling an inlet pressure up to 300 psi. They are said to provide accurate pressure regulation with practically no fluctuation in delivery pressure, because of low friction

Research Finds Extra Dollars of Income Through Savings in Maintenance!

IMPROVED FILTRATION IMPORTANT AREA FOR DEVELOPING OPERATING ECONOMIES

ANALYSIS OF TYPICAL SLUDGE IN DIESEL LUBRICATING OIL

Oxidized Oil (Resins)	19.0%
Amorphous Carbon (Soot)	34.0
Miscellaneous Metals	0.8
Silica	0.2
Water	3.0
Lubricating Oil	43.0

Shown at the left—the famous WIXITE Primary Fuel Filter Cartridge, long recognized for extra protection and extra mileage. At the right—the New WIX POROSITE Second Stage Fuel Filter which completely changes standards of performance in the filtration of Railroad Diesel Fuel Oil.

The analysis shown is that made of sludge deposits taken from a Diesel engine crankcase and it should be borne in mind that the percentages shown will vary substantially with: A) Different engines, B) Various types of service, C) Differing geographic areas and D) Efficiency of filters.

WIX Filter Cartridges are available in a broad selection of filtrants to enable maintenance technicians to prescribe precisely the filtering formula suited to the individual engine, conditions of service, etc.

Thus, with WIX Cartridges, higher filtering efficiency for each unit returns definite advantages in performance *and direct economies.*

WIX CORPORATION • GASTONIA • N. C.
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When it comes to immobilizing a Diesel Locomotive, an avalanche is neither more definite nor more costly than "just a little" dirt in Fuel or Lubricating Oil. The fact is—the "just a little" dirt costs America's Railroads infinitely more than all other catastrophes put together.

WIX Research is directed toward the twin objectives of: A) Filtration that reduces wear in engine moving parts, and B) Higher engine performance and extended periods between overhaul.

WIX Prescription Filtration includes new developments that promise definite and substantial savings in operating and maintenance costs. Laboratory and Field Tests point to improved operating efficiency, less time in the shop and less frequent lay-ups, lower filter cost per hundred miles. Yes, WIX Research Finds Extra Dollars of Income for You in Dollars You Save in Maintenance.

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in the internal mechanism and large effective area of the flexible diaphragm used.

The regulator body is a machined brass forging with a hexagon section that simplifies disassembly. The aluminum spring case is fastened to the regulator body by a forged-brass retaining ring. Hand tightening of this ring seals against leakage by means of a rubber ring which is part of the molded rubber diaphragm. For maximum strength and performance, the diaphragm has a nylon fabric insert. The adjusting screw is a forged brass knob with ribbing for a sure grip. *Air Reduction Sales Company, a division of Air Reduction Company, Dept. RLC, 150 East 42nd st., New York 17.*

Silconic Battery Plate

A Silconic battery plate that will deliver greater battery performance at lower cost and retard the tendency toward grid growth in motive-power batteries has been made possible by the development of a patented process for introducing arsenic and silver-cobalt sulphates into the active materials of positive plates. When added to the active materials, the silver and cobalt migrate to all positive grid members and collect on the grid members to form an insoluble oxide surface or protective sheath impervious to acid and oxygen. This oxide coating prevents the most common cause of battery failure—grid separations.

The new plate is said to result in industrial storage batteries having 10-25 per cent longer life and improved electrical characteristics.

In applications where batteries are idle for periods of time, the Silconic plate prevents migration of materials to the negative plate, reducing self discharge within the cell. Comparative tests between Silconic and conventional plates show that the Silconic plate maintains maximum capacity for a greater portion of its service life.

All models of the Thirty, Kathanode and Super Dreadnaught line of batteries will be available with the new grid. *Gould-National Batteries, Inc., Dept. RLC, Trenton, N. J.*

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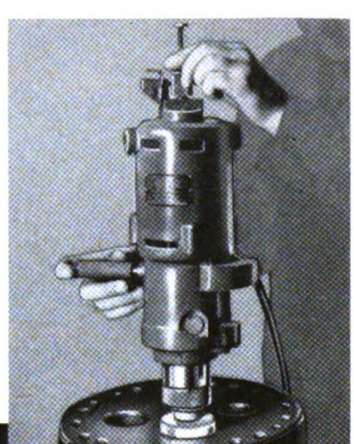

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Only Hall-Toledo's EDP Valve Seat Grinder can absolutely assure the finest performance results by providing perfect valve seating.

Whether you do your own valve work or have a diesel engine service organization handle it, be certain that HALL-TOLEDO equipment is used for faster, factory approved precision valve seat grinding. The MODEL EDP, especially designed for heavy duty diesel engines, will handle grinding wheels from 2" to 7" diameter. The Model EJ HALL-TOLEDO VALVE SEAT GRINDER is also available to precision grind smaller valve seats.

Write today *for information on the complete Hall-Toledo line for factory production or engine rebuilding work.*

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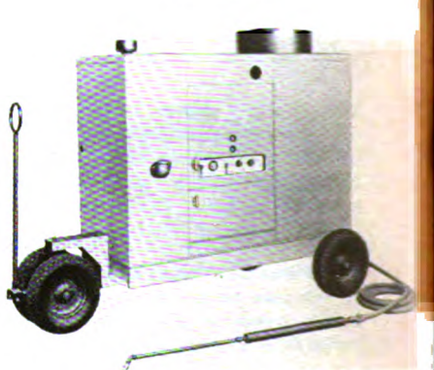

Steam-Hydraulic Cleaner

Heavy machinery and equipment is said to be cleaned from four to six times faster by the "3500" Series Hypressure Jenny. Eleven different cleaning actions are possible by the movement of a single lever in the new unit. Outlet pressures and temperatures are motor-powered . . . up to 250 gal per hr as a steam cleaner; up to 360 gal per hr as a hydraulic cleaner. The series comes in trailer-mounted, shop portable, or stationary models, with a choice of oil or gas for fuel. The shop portable model is 81½ in. long, 40½ in. wide, and 59 in. high. It weighs approximately 1,180 lb. *Hypressure Jenny Division, Homestead Valve Manufacturing Company, Dept. RLC, Coraopolis, Pa.*

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

PORTABLE DISTRIBUTION SYSTEMS FOR ELECTRIC LIGHTING AND POWER. Loose-leaf catalog gives complete information on Tuffline systems and component products. Pages showing examples of complete systems refer reader to page where component parts, molded of a special neoprene compound, are shown by drawings and described in detail. (Write: *Whitney Blake Company,* Dept. RLC, 1565 Dixwell ave., New Haven 14, Conn.)

PISTON RINGS. Three new catalog listings of Pedrick piston rings are: Form 376, which covers, by makes and models, diesel engines currently operated by most railroads, with Piston rings for each identified by part number, size, design type and description. Form 377 covers, by makes and models, air compressors used on diesel locomotives and identifies required piston rings. Form 378 is a net price sheet. (Write: Dept. SRA, *Wilkening Manufacturing Co.,* Dept RLC, Philadelphia 42.)

ALUMINUM WELDOR'S TRAINING MANUAL. 144-page booklet gives detailed instructional information designed to train and qualify individuals in welding aluminum by inert gas process. First section deals with tungsten-inert-gas and metal-inert-gas welding techniques. Types of equipment and supplies needed, welding practices, recommended filler material, preheat temperatures, etc., tabulated.

Second and third sections offer 23 practical step-by-step exercises to follow for proficiency in both methods, with photographs ,schematic drawings and sectional micrographs of metal-to-metal-fusion. Methods of preparing sections and instructions for bend testing weldments included. Booklet free when requested on company letterhead; $1.00 otherwise. (Write: *Kaiser Aluminum & Chemical Sales, Inc.,* Dept. RLC, 919 N. Michigan ave., Chicago.)

FLEXIBLE COATED INSULATION. 4-page folder contains technical data on electrical and physical properties of Fibremat flexible coated insulation. (Write: Dept. D8-342, *Irvington Division, Minnesota Mining & Manufacturing Co.,* Dept. RLC, 900 Bush st., St. Paul 6, Minn.)

STEAM HEATING CONNECTIONS. 4-page Catalog 99 includes construction details and data on types and sizes of flexible ball joint steam heating connections both for old and new passenger cars and locomotives. (Write: Dept. R-2, *Barco Manufacturing Company,* Dept. RLC, 500 North Hough st., Barrington, Ill.)

TANDEM WELDING. Bulletin 5200.2 describes multiple electrode submerged arc tandem welding process, its advantages and requirements. (Write: *Lincoln Electric Company,* Dept. RLC, Cleveland 17.)

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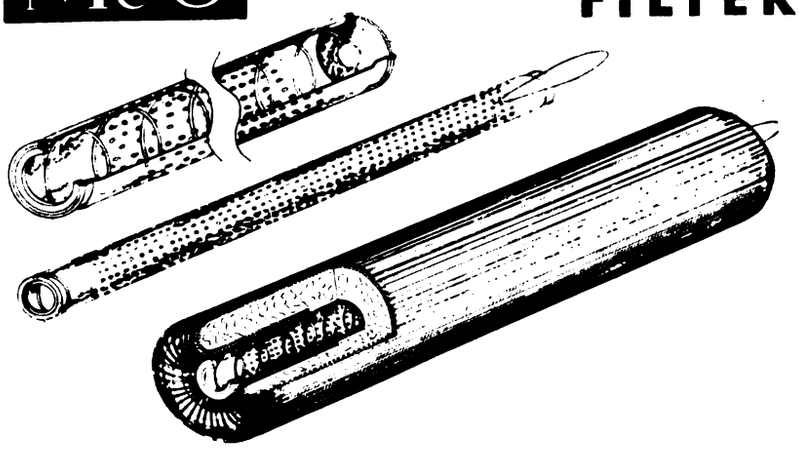
M&J CAGELESS FILTER



This low priced lube oil filter cartridge, the Cageless C-1251, is for use on all diesel locomotives. Eliminates problem of stocking two or more sizes of filter elements.

The Cageless Type filter will interchange with the Michiana and Nugent types. Filter cans may be disposed of, saving labor in the cleaning of cans and changing of filters. To adapt to the Nugent bowl, simply drill and tap the top plate that normally holds the cans in place. The filtering media in the Cageless Type consist of new cotton linters, of grades adequate to meet railroad specifications.

The perforated steel center tube is manufactured of 28-gauge cold rolled steel with spot-welded seam. Ends of the tube are "rolled" into a "safety edge" to prevent sharp edges, and a spring insert precludes possibility of collapse. A wire handle is fastened securely under the steel cap on the sealed end.

Cartridges are double-socked, both on the outside of the filter and on the center tube. The cotton stocking is a continuous piece of tubular carded yarn knit, with no breaks or imperfections, drawn smoothly over center tube and securely fastened with fiber tape.

Dimensions and weight of the completed filter cartridge are as follows:

Length—30¼" minimum; 31" maximum.
Diameter—6⅜" minimum; 6½" maximum.
Net weight of filter media—6 pounds, minus zero plus six ounces; or to meet railroad specifications.
Weight of complete cartridge—7 pounds 12 ounces minimum, to 8 pounds 7 ounces maximum.

The finished filter cartridge is free of voids, soft spots, or hard spots, and is evenly packed throughout the overall length of the cartridge.

M & J Filters available in Michiana and Nugent design

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ADVERTISERS IN THIS ISSUE

Air Maze Corporation 11
American Steel Foundries 40, 41

Baldwin-Lima-Hamilton Corporation, Eddystone Division 6

Cheston Company, Frank C. 57
Chemicals & Materials Corporation 58

Demp-Nock Company 64

Eddystone Division, Baldwin-Lima-Hamilton Corp. 5
Esso Standard Oil Co. 31
Ex-Cell-O Corporation 40

Griffin Wheel Co. 16, 17

Hall-Toledo, Inc. 62
Huck Manufacturing Company 55

International Nickel Company, Inc. 10

Journal Box Servicing Corporation .. Inside Back Cover
Joy Manufacturing Company 56

Lix Corporation 56

Magnus Metal Corporation 44, 45
Miller Lubricator Co. 18
M & J Diesel Locomotive Filter Corp. 63
Miner, Inc., W. H. ..... Inside Front Cover

National Carbon Company, Div. of Union Carbide Corp. 7
National Electric Coil Company 3
National Malleable & Steel Castings Co. 13

Schundler & Co., Inc., F. E. 60
Sprague Devices, Inc. 64
Standard Car Truck (Clevite Div) 37
Standard Oil of California 4
Sturtevant, P. A. 58

Timken Roller Bearing Company ..... Back Cover

Union Carbide Corporation, National Carbon Company 7

Waugh Equipment Company 9
Waukesha Motor Company 15
Wayne Tool Company 55
Western Railroad Supply Co. 55
Wine Railway Appliance Co. 34, 35
Wix Corporation 61

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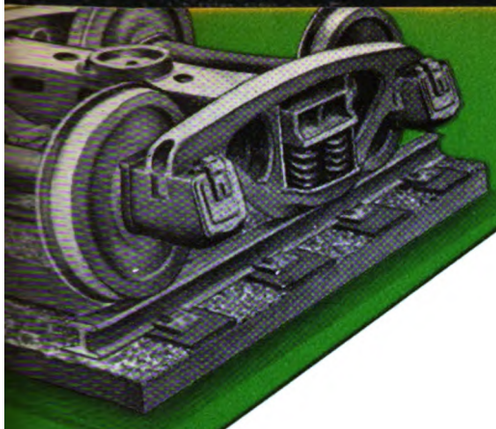

MEMO FROM THE GENERAL OFFICE

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- ★ Requires no modification of journal box
- ★ Wicks AAR specification car oil even in coldest weather
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Complimentary reports are coming in from scores of railroads throughout America, Canada and Alaska using JBS Acme Journal Lubricators, a product of the Journal Box Servicing Corporation, that JBS Acme Lubricators are greatly reducing hot boxes in their operations. JBS Acme alone has the exclusive all-wool quilted core* which retains many times its own weight in oil reserve. Heavy chenille loop pile surfaces assure an ample supply of filtered oil at all times and prevent glazing. JBS Acme Lubricators are unaffected by temperature changes and wick AAR specification car oil even at 45° below zero in road service tests. JBS Acme Lubricators require no modification of the standard journal box, are designed to hold their position in the box, and assure better performance with less servicing.

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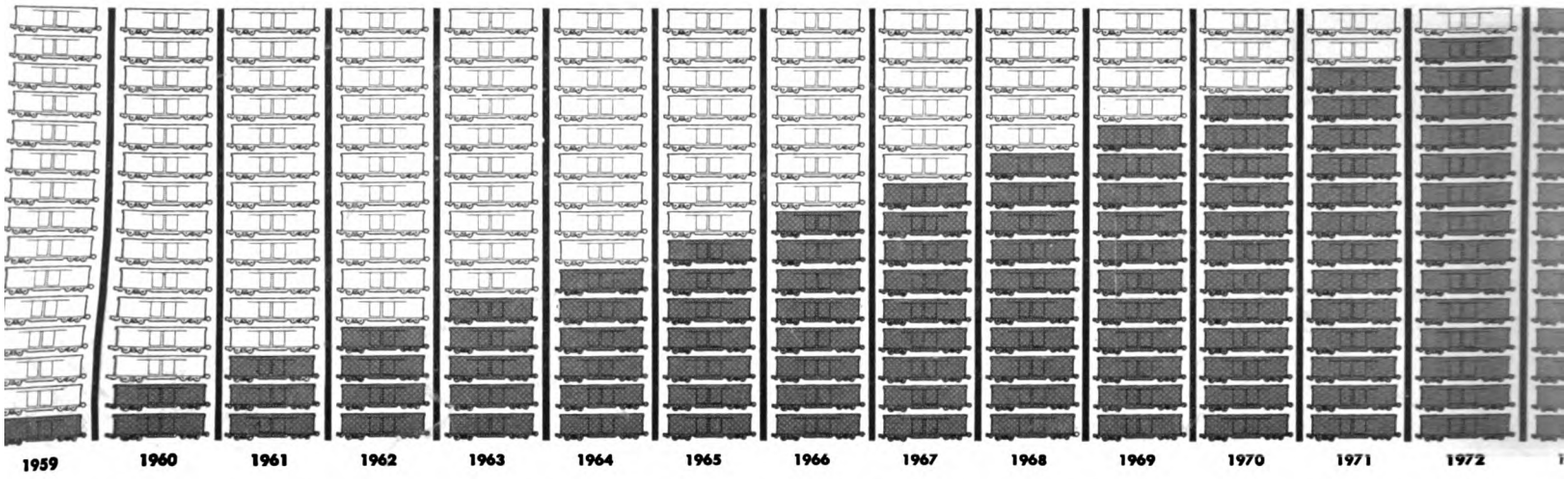


HERE'S A PLAN that will save railroads $288,000,000 a year!*

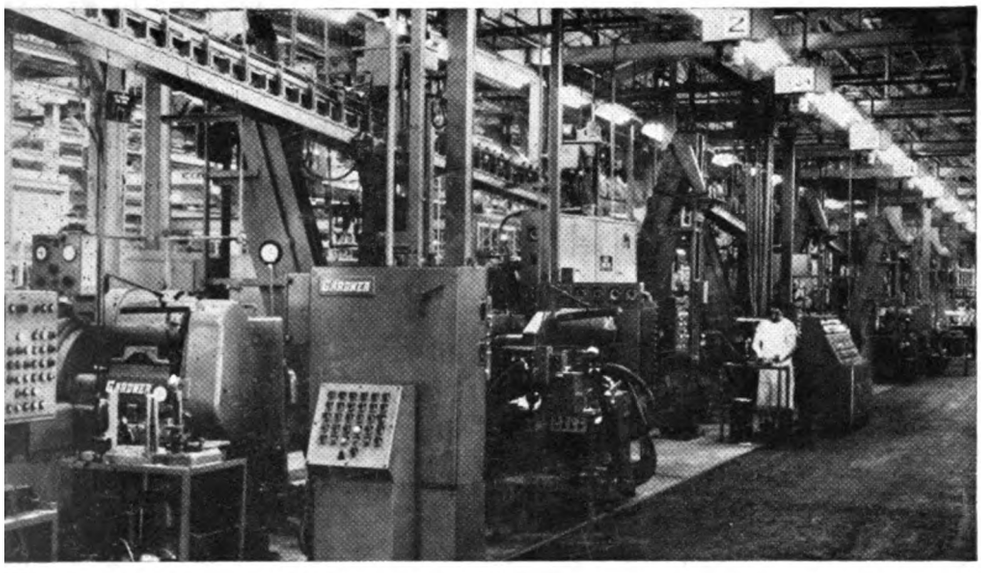
The railroads will save $288,000,000 a year in maintenance and operating costs when *all* freight cars are equipped with roller bearings—the bearings all railroaders want sooner or later. Here's a plan to start your roller bearing program—and savings—now!

Each railroad could put a certain percentage of its freight cars on roller bearings every month or every year. With all the railroads participating on a regular basis, the cost of putting roller bearings on freight cars would be held down. What's more you would be able to set up economical shop schedules to further reduce the cost of going "Roller Freight". And by putting these "Roller Freight" cars in interchange, all the railroads would get their share of the benefits. Benefits like these:

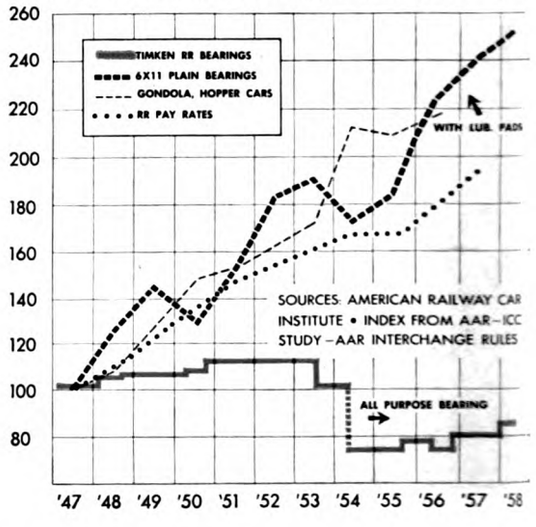
One railroad's Timken-bearing-equipped freight cars rolled over 300,000,000 car miles with only *one* overheated bearing. On another line, Timken-bearing-equipped cars recently rolled 216,000 miles each *without adding lubricant.* That's how Timken® bearings give you a 24½% return on the investment—why 69 railroads and other car owners have already put over 26,000 freight cars on Timken bearings.

Talk over this plan with your other railroad friends. The best time to start your "Roller Freight" modernization and new car program is right now.

**Based on 1958 labor and material costs. At anticipated 1973 costs, 15 years from now, savings would rise to an estimated $610,000,000.*



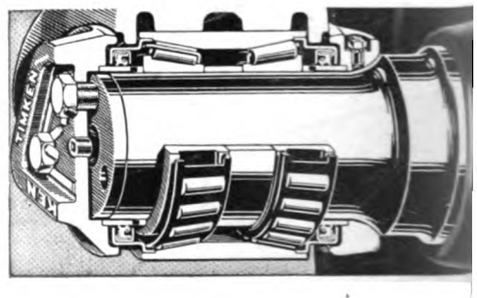
TIMKEN BEARING COSTS HAVE STAYED DOWN WHILE OTHER RAILROAD COSTS HAVE SKYROCKETED (INDEX 1947 = 100)



HERE'S THE PLANT that can help you do it starting right now!

The picture above shows our amazing new roller bearing production line at Columbus, Ohio. It mass-produces Timken roller bearings for freight cars only. Using missile-age techniques embodied in ultra-modern machines, it can turn out 20,000 car sets a year!

By planning your roller bearing purchases on a monthly or yearly basis, you can keep the machines in this plant going full-tilt. Holding down bearing costs will be the automatic result of planned purchasing. Even now the cost of Timken roller bearings has come down and down—while the cost of friction bearings and other things a railroad uses has gone steadily up (see chart at right). Today the extra cost of equipping a freight car with Timken bearings is just about half what it was 10 years ago. And our new plant is capable of narrowing the price gap still further between friction bearings and Timken bearings—if you help us keep the plant busy. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".



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